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Surgery, Gynecology and Obstetrics

WITH

International Abstract of Surgery

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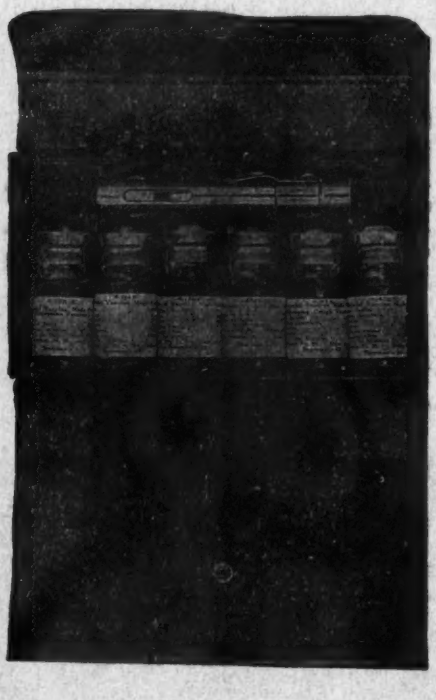

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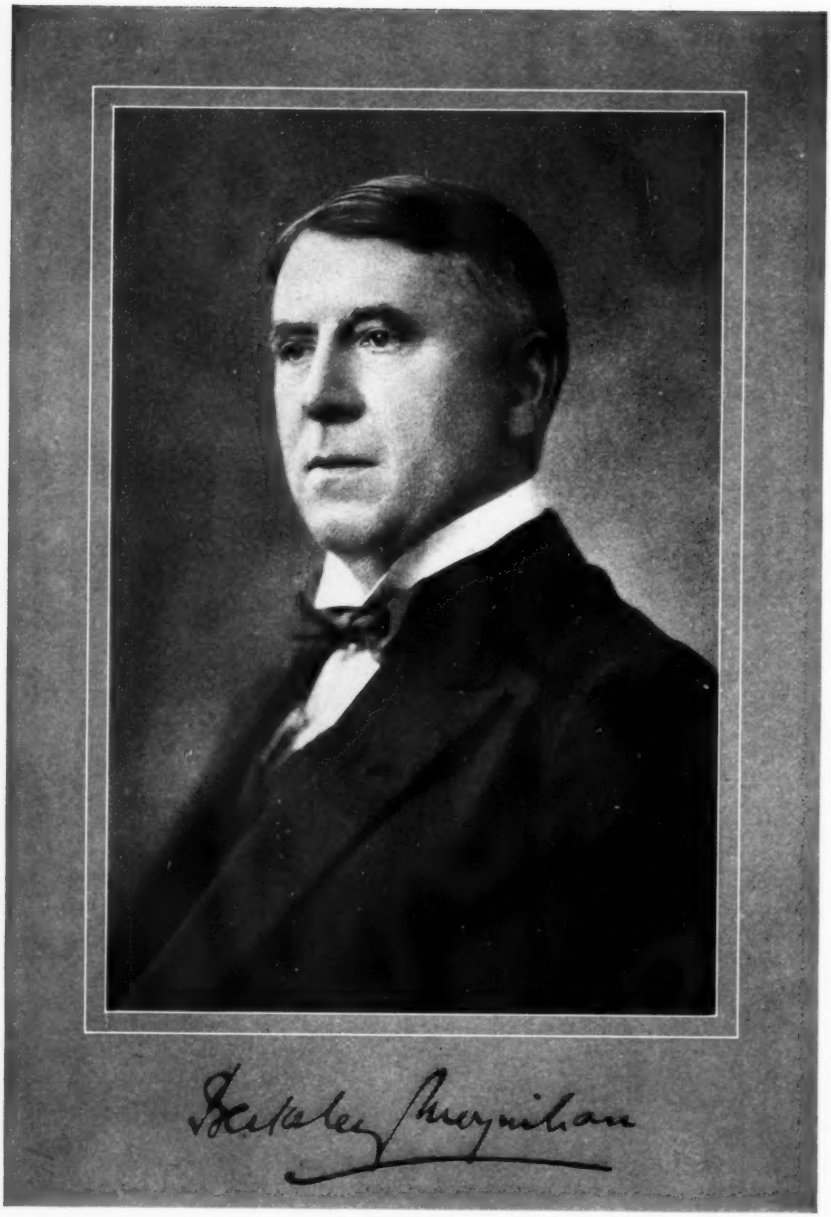


SURGERY, GYNECOLOGY AND OBSTETRICS

AN INTERNATIONAL MAGAZINE, PUBLISHED MONTHLY

VOLUME XXXI DECEMBER, 1920 NUMBER 6

JOHN B. MURPHY—SURGEON[1]

BY SIR BERKELEY MOYNIHAN, K.C.M.G., C.B., LEEDS, ENGLAND

"The moral of the whole story is this: that we should do all that we can to partake of Virtue and Wisdom in this life."

—Socrates is speaking.

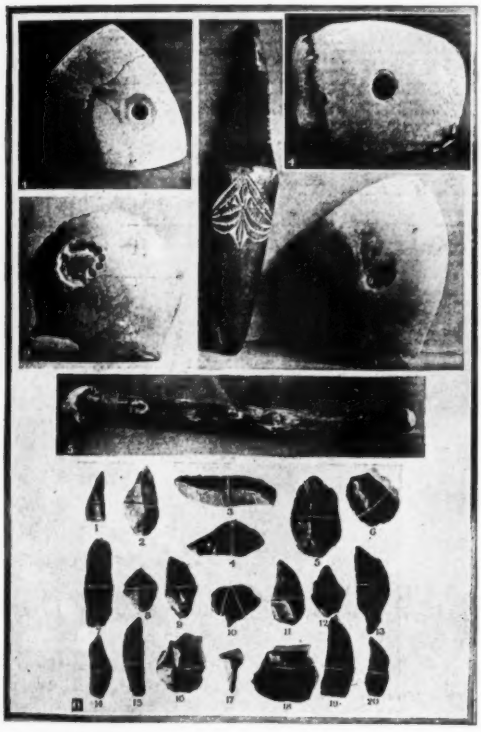
THIS is a day of remembrance. We have come together to do honor to one of the founders of this College, a great surgeon whose loss we mourn. You have laid upon me the duty and the high privilege of offering in your name and in my own, and if I may for the moment assume a wider responsibility, in the name of all the surgeons of his time, a tribute to the illustrious memory of Dr. J. B. Murphy.

John Benjamin Murphy was an arresting personality. Even after the briefest intercourse with him there were few people who did not realize that he possessed a curious and subtle power of impressing a sense of his character upon them. His very handsome face, his tall, spare, almost gaunt figure, his high pitched and vibrant voice, his burning and quenchless enthusiasm for life in all its manifold activities, his power of complete self-expression, all clamored for notice, and caught and held the most eager attention. His outlook was grave and serious; he seemed always in earnest. The little quips and sallies, the friendly taunts, the provocations to repartee, the illuminating anecdote, which in the United States distinguish the cordial intimacies of daily life, did not seem to play around him as freely as around other men. Even in a crowded room of busy men, or when a debate was keen he would steal a few moments for a whispered conversation, held aloof, on some topic that for the moment filled his thoughts. Among those who knew him well he was admired and deeply respected, rather than loved. Except to a very few he was not genial or responsive in friendship. His intellectual attainments were so considerable, and his position in the judgment of his contemporaries so secure, that jealousy hardly touched him, except perhaps in his earlier years and from a few among his seniors whose supremacy he challenged. Such jealousy is perhaps the tribute paid to youth for successful enterprise in thought or in action by minds which suffer from the atheroma of advancing years. We are reminded of the aphorism of Sir Walter Raleigh

"For whoso reaps renown above the rest
With heaps of hate shall surely be oppress."

Murphy was beyond question the greatest clinical teacher of his day. No one who listened to him can ever forget the experience. Before his audience arrived he had everything very carefully prepared, diagrams in order, microscopes ready, the patients examined and all relevant literature at his finger ends. There he stood in the middle of the circle, in the theatre, with his assistants and friends

[1] The first Murphy memorial oration delivered before the American College of Surgeons, Montreal, October 11, 1920.



Illustrations representing experiments of different kinds of primitive trephining with tools used. (*Lancet.*)

in the first row, and the other benches packed to the roof with eager students, or with medical men, who came again and again to learn from him afresh. As he began to speak one felt a strange sense of disappointment, and even of dismay. For while the handsome face and upright figure were things of real beauty, the voice in which he began to speak was quite unpleasant. It was harsh, even raucous, high pitched, shrill, apt to wander into other keys. It seemed strange that a man of Irish descent, and of so gracious and commanding a presence, should have a voice so lacking in softness, one which not only did not appeal, but actually displeased and almost repelled every listener. But as he continued speaking the voice gradually ceased to distract, it became smoother, quieter, and more evenly pitched, and all thought of it was now lost in rapt attention to the matter. For things were happening even while one's first emotions were roused. Questions were being asked, and answered, often with great rapidity, then would come a pause, in which with marvellous directness and power the lesson to be learned therefrom was driven home. The rally began again. A poor answer came, or an assistant, responsible for the clinical notes, had omitted to inquire upon some relevant point; raillery came in torrents, never ill-natured, never rancorous, but with just sufficient sting to leave a memory which would stimulate all future work. The discussion warmed imperceptibly; gradually the coherent chain of argument lengthened, as link after link, forged under our eyes, newly appeared; slowly there came a sense of excitement; of impending revelation; all inquiry, all disclosure, all argument, was leading up to something that we now ached to learn. Old observations and ancient truths were taking on a new complexion; relations hitherto unsuspected were here declared and explained. The whole intellectual mechanism underlying a great subject was being shown both in detail, and in all the majesty of many moving parts. Perhaps as we drew near to the end, when the whole story would be laid bare, a question barked at one of his audience would fail to be answered. With voice more clamorous, and almost menacing, with face strained and eager, with figure reaching forward and arm outstretched, he would hurl the question at others. Hearts beat faster, the spiritual anguish could hardly be borne. At last the answer would come, and after a final swift induction or brief summary; when the clinical journey was over, we sank back in happiness and mental repletion to wonder, if Stevenson could really have been right when he said, "It is a better thing to travel hopefully than to arrive," for this journey had been happy, though anxious enough, but the haven was a rest of tranquility, and wonder, and content.

And then Murphy would operate. Now of operators there are many types, and like every other work of art, an operation is the expression of a man's temperament and character. There are still among us "brilliant" operators, from whom I pray to be spared

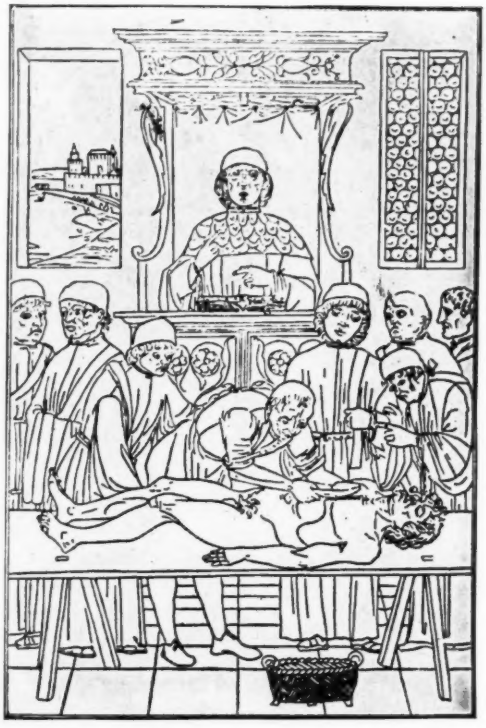
Hippocrates.

Galen.

when my hour has come. For them it is the mere quality of effort that counts. Their ideal of operative surgery is something swift and infinitely dexterous, something to dazzle the beholder, and excite his wonder that such things can so be done by human hands. The body of a man is the plastic material in which an artist works, and no art is worthy of such a medium unless it has in it something of a sacrament. Surgery of the "brilliant" kind is a desecration. Such art finds its proper scope in tricks with cards, in juggling with billiard balls, and nimble encounters with bowls of vanishing gold fish. But Murphy was of the true faith. He believed in safe and thorough work rather than in specious and hazardous brilliance. He was infinitely careful in preparation, and compared with many was inclined to be slow; but every step in every operation which I ever saw him do, was completed deliberately, accurately, once for all. It led inevitably to the next step, without pause, without haste; that step completed, another followed. "In sequent toil all forwards did contend." And so when the end came a review of the operation showed no false move, no part left incomplete, no chance of disaster; all was honest, safe, simple; it was modest, rather than brilliant. During the whole operation Murphy talked; not wasting time, but expressing and explaining aloud the quiet, gentle, dexterous movements of his hands and the purposeful working of his mind. The operation over, he would draw his stool near to the front row of the benches, cross one leg over another, rest his elbow on his knee and talk, as only he in all the world could talk, of surgery in general, of this case in particular, of his faults, of any experiment made to clear a doubtful issue. In these quiet talks there was none of the earlier passion, which had gleamed through him, and which, caught up by his audience had made them throb and tremble with suspense or joy. In them, all his former experience, all that he had learned by contact with men and books, all his native ingenuity of mind were now bountifully displayed: the vast resources of the keenest surgical intellect of his day were now displayed, not with ostentation, or with florid pride, but in such a quiet manner as to show that he rejoiced in the privilege of sharing with others so many fascinating and wonderful things. If in answer to a request a little intellectual gift were made to him, it was welcomed with frank, almost boyish enthusiasm, and with a delight and a humility obviously genuine.

Murphy as a writer and as a speaker was prolific. Whenever he spoke men made haste

Title page of Mundinus' *Anathomia*. Leipzig, 1493.



First known picture of an anatomical dissection.

to hear him. His audience, or so it always seemed to me, were often held back from quick appreciation. He was not like other men instantly attractive as an orator. Yet, as he developed his argument; little by little and step by step, the audience warmed to him, he interested them, he intrigued them, he dominated them, he fired them; intellectually he roused them to breathless interest; emotionally they were at times at the limit of self-control. No one could bear to miss a word, and while Murphy spoke no man left his seat. For his meaning was conveyed in pellucid language and though he might speak with the vehemence of raging conviction his thought was never obscured in a smoke of words. Such an intellectual lode stone was he that appointments were missed and hunger and thirst and fatigue were forgotten. For while Murphy expounded his gospel everything else seemed to fade in importance overshadowed by the lessons which were now being learned so eagerly.

I often wondered, as I listened, in what degree he resembled Lincoln. The tall, gaunt frame, and the harsh and meagre and strident voice were the same. Murphy must have been one of the handsomest men of the day; Lincoln's features were haggard, plain and homely, but his deep and glowing, sad and tender eyes no man could forget. Murphy had no such command of language as Lincoln, certainly one of the greatest orators who has ever spoken our language. But in effect they must have been alike. For they made everything else seem commonplace when they spoke, and they seemed to be delivering a message charged with truth and pregnant with confidence and hope. Lord Charnwood in his most excellent work on "Abraham

Andreas Vesalius.

Vesalius demonstrating anatomy.

Lincoln" writes of him: "His voice when he first opened his mouth surprised and jarred upon the hearers with a harsh note of curiously high pitch. But it was the sort of oddity that arrests attention and people's attention once caught was apt to be held by the man's transparent earnestness." How exactly was this the case with Murphy also. No one who heard Murphy speak ever doubted his sincerity. One might not agree; one might indeed profoundly and confidently disagree, with some statement he made, perhaps as though to provoke a challenge, for there was much in Murphy which justified his patronymic, and which discovered his ancestry; but there was never a thought that Murphy himself was speaking other than his deep and tried conviction. He never looked at truth askance or strangely. One who heard Lincoln speak at Peoria wrote: "Beyond and above all skill was the overwhelming conviction imposed upon the audience that the speaker himself was charged with an irresistible and inspiring duty to his fellow men." Such an impression was often felt by audiences while Murphy was addressing them.

One thing Murphy lacked; in one respect he grievously failed. If we consider the qualities which go to the making of the greatest surgeons, a foremost place must always be conceded to the capacity to train great disciples. The teaching, the diligence, the general outlook upon surgery and a finished technical skill can all be drilled into the minds, and imposed upon the methods of an earnest student. But it is the inspiration, the lofty sense of a sacred mission worthy of all the best that is in you, the dedication with humblest and fullest devotion to the cause of scientific truth, and of loyal service to mankind, that are awakened with a thrill in great men by great teachers. It is here that Murphy fell short. He trained no one worthy to be his successor; no evangelist who could carry into other clinics or to other

Anatomical theater, from Eustachius.

countries some of his glow, his fervor, his complete devotion, or the full meaning of his gospel. For this great omission there were perhaps some compensations. There were few clinics in any part of the world in which something taught by Murphy or inspired by him, had not crept in and found a home. His name was often on the lips of surgeons in all lands. His views impressed themselves on men's minds. His methods were closely copied. But when Murphy laid his mantle down there was no one ready and worthy to take it up. When we remember how the pupils of Turner, of Edinburgh, became professors in most of the chairs of anatomy throughout the British Empire, how many men Billroth trained to occupy with great distinction the chairs of surgery in eastern Europe, how Welch is the happy parent of a great school of pathologists trained by him, inspired by him, and looking to him with reverent affection, we cannot refrain from regret that some of the acolytes of Murphy did not grow to the stature of high priests.

Year by year Murphy grew in intellectual power and in the dominion he exercised over the minds of men. A problem took on a different aspect if Murphy were engaged in it. He touched the common currency of surgical thought and changed it into gold. For no effort of his was meaningless or sterile and all the powers of his mind and of his frail body were spent ungrudgingly in all his work. His well stocked library, and all new literature were searched for him, and dispatches made for his assimilation. He worked as all great men should work, with a clean desk. His great powers were used for worthy purposes and in due season, nothing was wasted in mere hack work, for all that could be equally well done by others was left for them to do. Yet all his life he overworked. He had an inner restless spirit, which drove him at full speed. He must work, and while at work there was only one speed, the highest he could command. "I do not wish to linger after my work is done" he said, and it was exactly what might have been expected from him.

It is useless to wish that men possessed of his qualities and capacities should use themselves differently. A man must do as he must do. If we think that Murphy by spending himself with less lavish extravagance might have prolonged his life another ten years and so have achieved even greater results, to the benefit of all mankind, we are pondering over one who was not Murphy, and who could not in those early fruitful years have been so avaricious for work, or have so generously poured forth the new truths of which he was at once both parent and missionary. Our designs for another

man's life are but futile exercises of an imagination lacking in full understanding and adrift from realities.

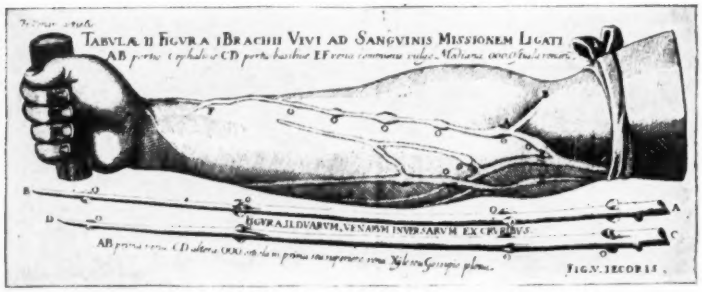
Such then was Murphy as I knew him. It is easy now to see how great a figure he was in the world of surgery of his day. When all his work is reviewed, when not only its range, but the wonderful sincerity and the permanent and piercing accuracy of so large a part of it are considered; when we remember his unequalled gifts as teacher, his power of lucid exposition and of persuasive, or coercive argument, his devotion for many years at least to experimental research, it is no exaggeration, I think, to say of him that he was the greatest surgeon of his time. Great men are fitted to their times and in many respects are a reflex of them. But as their times pass their work is seen in far perspective and may appear to shrink in significance. It may then seem to have lost all its originality, and boldness, and force, and we who stand afar off untouched by the magnetism of a great personality, marvel at its influence in its own day. For there are few indeed who enjoy both celebrity and fame. "Mere talents are dry leaves, tossed up and down by gusts of passion and scattered and swept away; but genius lies on the bosom of Memory." How then will it be with Murphy? Judged by the standard of his contemporaries he was an intellectual giant, but of what stature will he be when judged by the standard of history? May I ask you to bear with me while I pass briefly in review some of the main features of the progress of surgery as science and art and tell the tale of some of the great men who have labored in it, from earliest days up to the present time, so that at last we may see how Murphy stands and what figure he will make in the Great Procession.

The earliest remains of man known to exist show that the art of the surgeon was practiced upon him. Wherever skulls of the Neolithic period have been discovered the openings made in them by the trepan are seen. Dr. Marcel Badouin, in 1908, found within a tomb discovered by accident at Belleville the remains of 120 human beings. Eight of the skulls had been trepanned, and the edges of the cut bones were smoothly healed over,

Gabriele Fallopio (1523–62).

showing beyond doubt that the patients survived the operation for periods long enough for this to be fully accomplished. The disc of bone removed is supposed to have been worn as an amulet. The operation of trepanning during the Neolithic period, was also performed in England, in Northern Africa, the Canary Islands, Mexico, and in Peru. It is performed today by the natives of New Ireland, to the east of New Guinea, by methods and with results apparently similar to those of the Neolithic age. Dr. Redman has presented to the Royal College of Surgeons of England a group of five skulls showing the effects of the operation, the instruments by which it is there performed, and the dressings applied to the wound. And travelers tell us that the operation is still practiced in the ancient way, so far as can be judged, by the Quichuas of Peru. Surgery is therefore as old an art as any.

Hippocrates was the first to give form and spirit to the practice of surgery. His observa-


TABVLA II FIGVRA I BRACHII VIVI AD SANGVINIS MISSIONEM LIGATI
FIGVRA II DUARUM VENARUM INTER SARUM EX CRURIBUS
FIG. V. II. CO. D. II. S.

From Fabricius, showing valves of the veins.

tions even when considered with the fuller knowledge of today often bewilder us by their accuracy, insight, and sagacity. His clinical methods judged by our modern standards were broad-based and structurally sound. He recognized not only the nobility of the art of surgery, and the worthiness of its practitioners, but was well aware of the powerful influence which the craft must exert upon the science of medicine. The divorce of hand from brain which modern custom has worked hard to effect derived neither sanction or authority from any words of his. As he deals with the outward showing diseases his clinical method is everywhere the same. He observes, reflects, weighs, and judges, considers his former experience of the like or analogous conditions; he suggests or discovers a general truth; he lays down principles for action and he tells how the craftsman shall work. If the power of wide and accurate generalization be, as I believe it to be, among the supremest accomplishments of the human mind, then Hippocrates may in truth be said to have had few rivals, if indeed he has had any, among all those who in later times, and in all countries, have devoted themselves to the science of medicine. For by his injunctions as to the method of inquiry into the conditions of a patient suffering from any disease he lays down for the first time the principles upon which inductive research is founded. He is the parent, not of medicine alone, but of the inductive method as applicable to all branches of natural science. It is a proud claim that the method found its first application in the science of medicine.

HIERONYMVS FABRICIVS AB AQVAPENDENTE, EQVES MEDICVS, ET ANATOMICVS IN OMNI PATAVINO
SECVNDVS PIVS
Martia Fabricio iactat se Nomine Roma,
Tendula Fabricium tu quoque gignis Aqua.
Nobile Fabricio genus, inclita Roma, dedisti,
Pendentem hic contrà Nobilitavit Aquam.

Fabricius ab Aquapendente.

His observations upon cerebral injuries were hardly bettered until our own day, and many of his instructions as to their treatment cannot be neglected even now. He notes the effect of brain injuries upon the limbs of the opposite side. His work on fractures and dislocations has received praise from the

greatest of critics. Littré spoke of it as "the grandest surgical monument of antiquity" and considered that the truth of its principles was eternal. A century ago the most eminent of French surgeons, Dupuytren, published a work on "Dislocations." Malgaigne, whose familiar name justly carries great weight, judged that, in respect of its discussion of congenital dislocations, the work of Hippocrates was the richer and more accurate. The discourse of Hippocrates on "Wounds," which I read once again in the early weeks of the War, seems to have, in more relations than one a bearing upon our bitter experience of those most grievous times. Certain it is that for 1,500 years afterward nothing so apt was written; by no one were the essential problems of wound treatment so well understood. The dressings applied to wounds, he tells us, were to be of new materials; water, if not clean and sweet, was to be boiled and strained before use; care of the surgeon's hands and nails was thought most necessary. Oil and wine were the balsam for a bruised or dirty wound; or for one long neglected. The accurate apposition of the wound surfaces and the exclusion of air were means to secure rapid healing by "primary intention" which was clearly distinguished from "second intention." He dreaded amputation of a limb, especially near the trunk: these operations today are in respect of their mortality still among the most lethal of all. As Sir John Tweedy has said, "The directions which Hippocrates gives concerning the arrangements of the operating room, the placing of the patient, the position of the assistants, the disposition of the lighting, the care to be taken of the surgeon's hands, the need of ambidexterity, all indicate a careful and experienced practitioner." Hippocrates may count among his greatest glories that he recognized the essential unity of medicine and surgery, or rather that he did not distinguish between them: that he urged and practiced the use of all means for the examination of the patient; that he saw no degradation as did so many later ages in the use of a physician's hands in the service of the individual patient, for whose welfare, as Aristotle said, all medicine exists. And his system which embodied observation, reflection, judgment, all multiplied to make experience which shall decide right action, stands firm until this day. He knew its difficulties for he tells us that "experience is difficult, verification fallible, observation long and costly, and occasion fleeting." There is one gap, however, a significant one in view of my later contention, in his method. He did not put matters to the proof by way of experiment. The experimental verification or denial of a suggested truth, or the new adventures in thought and action opened up by this method were not for him.

After Hippocrates we may take a long stride in point of time to the days of Celsus, who lived in the reign of Augustus Cæsar. It is interesting to remember that Celsus, the manuscript of whose work "De Re Medicina," written about 30 A.D., was discovered in 1443 in the Church of St. Ambrose at Milan by Thomas of Sezanne, afterwards Pope Nicholas V, was almost certainly not a physician. He was a noble of the family of Cornelii, who wrote works on medicine, agriculture, philosophy, law and the art of war, in the spirit of an interested amateur. The deep prejudice of the patricians against the adoption by one of their class of medicine as a profession was unconquerable. And the internal evidence in all his writings is opposed to the view that he could have practiced as a physician; he mocks at the value of medicine, and esteems the empirical methods of folk medicine as of equal interest and value to the academic methods of his time. He tells us that the true art of medicine lies in the correlation of theory and practice, the one guiding and controlling the other; speculation should guide thought but not determine practice. References to surgical matters are found in all the Books, but Books VII and VIII, are devoted exclusively to the consideration of surgical matters. The great feature of these is that they record all the changes which had occurred in our art from the time of Hippocrates and especially informs us of the great attainments of the Alexandrian school in anatomy and surgery. He describes wound treatment in detail; arrest of hæmorrhage in a wound may be effected by packing and

pressure, or by the ligature, which finds its first mention in his work. Sutures are to be used to secure apposition of wound surfaces and edges, and, as a dressing, linen bandages are to be soaked in wine, water or vinegar. He gives in sufficient detail a description of operations for the radical cure of inguinal and umbilical hernia; and for the first time he refers to the removal of the testis as allowing a firmer and more secure closure of the inguinal canal. He mentions translucency as a test for hydrocele, and describes the tapping of dropsies. He quotes a large number of surgical authors, but among them all only Hippocrates is known to us.

It is evident that by the time of Celsus the boundaries of surgery had been sensibly enlarged, that old procedures had been bettered, as in amputations, and that many new ones had been devised. But progress had been along the old lines, and was achieved by the old methods. He recorded the multiplication and the magnification of old experiences rather than the revelation of new discoveries. He it was who gave us the fulfillment of the promise of the Hippocratic methods.

But great as were these methods, and considerable as was the success attending their application, there had been a slumber of the intellectual and philosophical aspects of medicine. Hippocrates had united in his own person many divergent and opposing tendencies; after his death there was an acceptance of the teaching by various sects, each adopting a part only, and dogmatism with its cramping tendencies crept in and the spirit of investigation died away. There was need now of a philosopher with new vision and the need was supplied in Galen. Of Galen's life and character we know much, for he was vain and ambitious, garrulous and verbose. He was trained and deeply versed in all the current philosophies. A dream of his father, Nikon, interpreted as a vision from the God of Medicine, decided his choice of a profession. After the death of his father he wandered for 9 years studying in Corinth, Smyrna, and especially Alexandria, which then attracted commerce and patients from all parts of the world. His opportunities were great and his use of them unwearying. He wrote works on anatomical and physiological matters, and attained even in these early years of his a reputation for wisdom and sagacity. For four years he lived in Rome. His learning, his industry, his friendship with the great and the noble, brought him high repute. But the envy of his colleagues, which he did much to provoke, was his downfall and he fled in fear of his life, to return on the invitation of Marcus Aurelius some 12 years later. But Galen's chief claim to honor, an imperishable one, is that he was the first of physicians to bring experiment to the aid of medicine. As Hippocrates was the parent of inductive method, so was Galen of the deductive. He was the first experimental physiologist. It was he who first discovered and described the cranial nerves, and the sympathetic nervous system: he divided the spinal cord and produced paraplegia: he severed the recurrent laryngeal nerve, and produced the hoarseness and aphonia, which are the constant results of this injury. He discovered the function of a muscle by studying the loss of power which followed its division. He demonstrated the flow of urine from the kidney to the bladder along the ureters, by a series of experiments than which nothing today could be more conclusive. And he trembled at the very edge of a great discovery when he wrote: "If you would kill an animal by cutting through a number of its large arteries you will find the veins becoming empty along with the arteries; now this could never occur if there were not anastomoses between them." Unhappily experiment alone did not content him, nor experiment in close alliance with clinical observation. His knowledge of anatomy, unsurpassed by any of his time, did not keep him aloof from the wildest speculations, in natural philosophy. It is interesting to learn from him that the art of dissection was mainly, if not wholly, confined to certain families, among whom tradition and instruction gave rise to a *caste* of dissectors. The members of a family were, from their childhood, exercised by their parents in dissecting, just as familiarly as in writing and reading, so that "there was no more fear of their forgetting their anatomy, than of forgetting their alphabet."

Galen's dissections were confined to the bodies of animals and the facts so discovered were applied by analogy only to the bodies of men. If a physiological hypothesis charmed him, his anatomical observations had to give way to it. His mind ran riot in speculation, often fantastic and far-fetched, but occasionally showing a gleam of real insight, as for example in his belief that there was a close primary correspondence between the sexual organs of the male and female. But the evils were great and lasting. It was his rash conceits rather than the facts of his experiments, or his sound anatomical knowledge, and broad scientific purpose which were remembered, and indeed almost sanctified, by all men for a period of over 1500 years. Though he was the first of experimenters he asserted that speculation should lead experience and he exalted a debased metaphysics to a height exceeding that of strict and sober observation. In the times of intellectual stagnation in the Dark Ages the writings of Galen had an unequalled authority; and it was only by a notable independence that Abdollatif dared to assert that anatomy was not to be learned from books and that even Galen's observations were less to be trusted than the evidences of one's own senses. The result was the sterility and the abasement of medicine, until the experimental methods were revived by his direct intellectual descendent, William Harvey.

In a rather different sensé, and in a different scene, the great traditions of medicine were handed on by Avicenna, who was born in Bokhara about 980 A.D. It was through him that the works of Hippocrates and Galen became widely known throughout the East, and finally filtered back into Europe through the Arabs and Moors at a time when learning and culture had almost vanished. The Arabian mind was essentially concerned with compiling knowledge from all sources rather than in initiating inquiry; and a great and useful work, in this direction, was carried out by them during the brightest days of the Saracen Empire. The modern world indeed owes much to their careful preservation of knowledge and their multiplication of copies of standard medical works, before the era of printing; even though the science and art of medicine in itself did not, through their efforts, advance one step. In Avicenna we find a mind as keen as that of his great predecessors, viewing the human body and its ailments in his own way, although numerous points of resemblance to the works of Galen and Hippocrates are everywhere evident. He was not an experimenter so much as a philosopher and the power of his mind over so many later centuries is probably to be attributed to his masterly grasp of all sciences as well as of medicine and surgery. In the art of surgery he can hardly have attained the skill of the great founder, as far as can be judged by the records in the Canon. We do not find all those evidences of mastership in technique which shine so strongly through the writings of Hippocrates. As is characteristic of the Eastern today the knowledge which he possessed and, to judge by the records of his successes, utilized with great practical effect, was of a different order, both intuitive and logical, but intuitive before logical. His skill in dealing with fundamental mathematical problems is hardly surpassed at the present day and in this respect he has been almost the only instance of a great mind applying mathematical concepts to medicine and surgery, up till the present era.

Of other writers before the sixteenth century, it is not unfair to say that they all, or almost all, were merely recorders, encyclopædists it may be, but devoid of any spark of new thought or of wise generalization. They preserved with reverence the old tradition, and the ancient knowledge, they discussed every device, and, at interminable length, the meanings of the old scriptures; they tortured new meanings out of old phrases, they were diligent in dressing old words new, and their scholarship was judged by their ingenuity, or infinite prolixity, in so doing.

The anatomists of the Middle Ages prepared the way for new enlightenment. The oldest treatise on anatomy comes from Egypt. The papyrus dates probably from the reign of Thutmosis I, that is from before the crossing of the Red Sea by the Israelites. It shows the heart with vessels proceeding from it, the liver, spleen, kidneys, ureters,

and bladder. The first of comparative anatomists was Aristotle. The expedition of his pupil Alexander into Asia, which he accompanied, gave him unprecedented opportunities for the study of many animals; the result of his work is contained in several books. The first dissections of the *human* body were made by Erasistratus and Herophilus, of Alexandria. Under the Ptolemies in Egypt were garnered all the fading philosophies and sciences which amid the dissensions and distractions of life in Greece, could no longer flourish there. Alexandria then became the guardian and the host of all the sciences and the literatures of the world. It was here, as we have seen, that Galen learned much of his anatomy.

After the darkness of succeeding centuries the first gleam of dawn was seen in the University of Bologna. For over 100 years it had been renowned as a center of scholastic knowledge, of literature and of law. Mundinus, the father of anatomy as he is always acclaimed, lectured there between 1315 and 1325, and publicly demonstrated the structures of the body as disclosed by dissection. His descriptions are remarkable alike for their extent and their accuracy. The claim has been made for him that he went near to the discovery of the circulation of the blood, for he says that the heart drives or transmits the blood to the lungs. Two centuries later (1514–1564) was born the greatest of all anatomists, Andreas Vesalius, a native of Brussels, a student at Louvain. The difficulties of performing dissections were so great in France that he went to Italy for freer and larger opportunities. "My study of anatomy," he says, "would never have succeeded had I, when working at medicine in Paris, been willing that the viscera should be merely shown to me and to my fellow students at one or another public dissection, by wholly unskilled barbers, and that in the most superficial way. I had to put my own hand to the business." When 21 years of age he was asked to lecture at the University of Padua. His original additions to the science of anatomy were numerous and of the highest importance. He swept away much of the old "analogical" anatomy, the surmises and the errors, hoary with age, and sanctified by their free acceptance by a multitude of authors in the centuries after Galen formulated them. His work on anatomy is adorned with illustrations which for beauty of design and accuracy of execution have never been surpassed, indeed, I think not equalled, since they were published. It is said that the figures were drawn by Titian. Cuvier remarks that if this be not true they must at least be the work of one of his most distinguished pupils. But Vesalius did something more than all this. He was the first imitator of Galen in experimental work and though he did little enough it was sufficient to show that the method was not utterly forgotten. He was the forerunner of those distinguished Italian anatomists who may share with him the credit for the creation of the science of anatomy, of Eustachius, of Fallopius, who in his short life labored to great ends, and of Fabricius his successor in the chair of anatomy and surgery of Padua, among whose pupils was William Harvey. The presence of folds in the interior of some veins had been noted by Sylvius and Vesalius and others, and those of the vena Azzgos were particularly described by Canani in 1547, but it was Fabricius who recognized the existence of valves throughout the venous system and who observed that they were all turned toward the heart.

Harvey had been attracted by the fame of Fabricius to Padua, at a time when Galileo was teaching and was engaging in those methodical researches whose influences have lasted to our own day. Harvey said of himself that he felt it in some sort criminal to call in question doctrines that had descended through a long succession of ages and carried the authority of ancients, but he "appealed unto Nature that bowed to no antiquity, and was of still higher authority than the ancients." It was at the instigation of Fabricius that Harvey undertook by experiment to discover the function of the valves in the venous system and in the year of Shakespeare's death those experiments whose end was to bring about the greatest discovery in the history of medicine were begun. The discovery had almost been made by half a

dozen of his predecessors who appeared to have stood upon its very brink. As Cuvier says, we are often on the edge of discovery without suspecting it. There can be little doubt that the pulmonary circulation had been recognized by the unhappy Servetus, who, with his works, was burned as a heretic at Geneva in 1553 by Calvin.

In 1559, a pupil of Vesalius at Padua, Realdus Columbus, may be said to have suggested the existence of this circulation by inductive reasoning, but to ingenious speculation the minds of men were hardened. It was open demonstration and proof that were needed to press home an opinion so contrary to all accepted teaching.

A discovery is rarely, if ever, a sudden achievement nor is it the work of one man; a long series of observations each in turn received in doubt, and discussed in hostility, are familiarized by time, and lead at last to the gradual disclosure of the truth. Harvey's discovery was finally due to his application of the experimental method of Archimedes and Galen to a problem of which many of the factors were already known; or as he himself tells us, the circulation of the blood was held to be completely demonstrated by experiment, observation, and ocular inspection against all force and array of argument. He writes: "When I first gave my mind to vivisections, as a means of discovering the motions and uses of the heart and sought to discover these from actual inspection and not from the writings of others, I found the task so truly arduous, so full of difficulties, that I was almost tempted to think with Frascatorius, that the motion of the heart was only to be comprehended by God. . . . At length and by using greater and daily diligence, having frequent recourse to vivisections, employing a variety of animals for the purpose, and collecting numerous observations, I thought that I had attained to the truth."

The reception of this discovery was generous at home; tardy and reluctant, or openly hostile abroad. But it was everywhere eagerly and hotly discussed. Harvey says: "But scarce an hour has passed since the birthday of the circulation of the blood that I have not heard something for good and for evil said of this my discovery. Some abuse it as a feeble infant, and yet unworthy to have seen the light; others again think the bantling deserves to be cherished and cared for. These oppose it with much ado, those patronize it with abundant commendation."

Riolan, distinguished as an anatomist, and professor at the College de France, denied and derided it. What Harvey felt of the opposition may be learned from his reply to a friend who urged upon him the publication of his later work *De Generatione Animalium*. "And would you then advise me to quit the tranquility of this haven, wherein I now calmly spend my days and again commit myself to the unfaithful ocean? You are not ignorant how great troubles my lucubrations, formerly published, have raised. Better it is certainly at some time, to endeavor to grow wise at home in private than by the hasty devulgation of such things to the knowledge whereof you have attained with vast labor, to stir up tempests that may deprive you of your leisure and quiet for the future." Nevertheless, compensations and rewards came to him in full measure, and he had the satisfaction of living to see the general acceptance of his discoveries. This discovery, as Whewell said, implied the usual conditions, distinct general notions, careful observation of many facts, and the mental act of bringing together these elements of truth. Boyle wrote: "I remember that when I asked our famous Harvey what were the things that induced him to think of a circulation of the blood, he answered me that when he took notice that the valves in the veins of so many parts of the body were so placed that they gave a free passage to the blood toward the heart, but opposed the passage of the venal blood the contrary way: he was incited to imagine that so provident a cause as Nature had not placed so many valves without design: and no design seemed more probable than that the blood should be sent through the arteries and return through the veins whose valves did not oppose its course that way. That supposition his experiments confirmed."

But the experimental method of Galen, revived by Gilbert, physician to Queen

Elizabeth and the father of modern experimental science, and practiced with such supreme effect by Harvey, was to find as yet no place in scientific surgery. That art it is true was practiced with wider scope, with confidence bred of generations of experience, and with a risk that was perhaps steadily though almost negligibly diminishing. Safety was rather dependent upon the individual capacity of the surgeon than a quality common to the work of all. Richard Wiseman, who was born 3 years after the publication of Harvey's discovery, is generally granted the proud title of the father of English surgery. He was a man "given to the observation of Nature" and became Sergeant Surgeon to Charles II and to James II (who when Prince of Wales and Duke of York were withdrawn under a hedge October 23, 1642, during the battle of Edgehill, when Harvey distracted their thoughts by reading to them) and among his contributions to the craft of surgery may be mentioned his operations for hernia, and his advocacy of primary amputation in cases of injury, by gunshot or otherwise, of the limbs. Ambrose Paré was to French surgery what Wiseman was to British. The life of Paré is one of the greatest romances in the history of our profession; it tells the story of the progress of the son of a joiner who was groom, gardener, barber's apprentice, until he became at last the surgeon to four kings of France. It was he who was concealed, locked up in a room of the Louvre, and spared from death by special order of Charles IX at the Massacre of the Huguenots on the day of St. Bartholomew. For the King said that it was not reasonable that a man who was worth a whole world of men should be murdered. He is the outstanding medical figure in the Renaissance. He was untaught and therefore in youth at least free from the trammels of ancient lore. Early in life he said: "I make no claim to have read Galen either in Greek or in Latin: for it did not please God to be so gracious to my youth that it should be instructed either in the one tongue or in the other." When at last he read Hippocrates and Galen he surpassed them both in the number and variety of the conditions he had been called upon to treat; and he was therefore the better fitted to approach their teaching in the spirit of an informed and practiced critic. "We must not be drugged by the work of the ancients as if they had known all things or spoken all," he writes. Yet in later years he studied diligently for he was said by Thomas Johnson, who translated and edited his works, to be "a man very well versed in the writings of the ancient and modern physicians and surgeons." He was one of the greatest original minds our art has known, fearless, independent, alert, and inventive and not without a good conceit. "There be few men of this profession" he writes, "which can bring so much authority to their writings either with reason or experience as I can," and again, "I have so certainly touched the mark whereat I aimed, that antiquity may seem to have nothing wherein it may exceed us beside the glory of invention, nor posterity anything left but a certain small hope to add some things as it is easy to add to former inventions." He won for surgery and for those who practiced the craft in France a place they had never before attained.

Surgery was still lacking its firm foundation in pathological anatomy. This was to be built by Morgagni and John Hunter and by many others taught and inspired by them. The tireless industry, unwearying care, and profound sagacity of John Hunter, gave to an art that was largely empirical a warrant based upon a sound knowledge of morbid processes in all tissues. He was observer, investigator, collector, in each capacity without a rival. He was unceasing in his search for truth by way of experiment. "Don't think, try the experiment," he urged his pupil Jenner. In his own person he did both, supremely well. His disregard of the written word was deplorable no doubt: but refreshing after so much barren speculation among his forerunners. "I am not a reader of books," he said; and again, "I believe nothing I have not seen and observed myself." His rebuff to one who accused him of ignorance of the classics is famous. "Jesse Foot accuses me of not understanding the dead languages: but I could teach him that on the dead body which he never knew in any language, dead

or living." Often he recounts the details of an experiment but leaves us to draw the conclusion. He changed the whole spirit of practice and placed knowledge on the throne of authority. The day was gone forever when a pure and dangerous empiricism could be practiced: surgery became a science and its craft a rational procedure. The museum which he founded and which still bears his name in the Royal College of Surgeons of England is unsurpassed in all the world, and his own specimens are still to be seen to bear witness to his incomparable services to pathological anatomy. For Morgagni no praise can be too high. His letters may be read today with delight; though his knowledge of disease is, in the modern view, often steeped in mediævalism, his long array of facts and of relevant instances, his description of morbid parts, his accurate and searching generalizations are among the greatest contributions to medical literature in all the ages.

Such was the progress of surgery up to the early years of the nineteenth century. The discovery of the anæsthetic properties of ether and chloroform completely changed the possibilities of the range of applications of surgery to morbid conditions and enlarged also the scope of experimental work upon animals. But in every direction the surgeon's work was hampered and frustrated by the occurrence of infection and all its dire consequences, in the majority of the wounds inflicted. It was for Lister that the world was waiting and his coming changed everything. For, as Carlyle said, "The great man was always as lightning out of Heaven: the rest of men waited for him like fuel, and then they too would flame."

Lister, as every one knows, introduced the antiseptic system into surgery. Before his time the wounds inflicted by the surgeon, or those received in civil life as in cases of compound fracture, became septic almost as a matter of course. The decomposition of the wound discharges was formerly held to be due to contact with the oxygen of the air. Lister recognized that the investigation of many observers, ending with Pasteur, which showed that fermentative and putrefactive processes depended upon minute organisms, were applicable in surgical work also. In the year 1836, a French observer, G. Latour, had pointed out that the tiny particles of which yeast was composed were capable of multiplication, that they were in fact alive, and that it was by their propagation that the change known as fermentation, the change of sugar into alcohol, was produced. Both Latour and T. Schwann showed that this process could be suppressed by the application of heat to the yeast. Schwann, especially, called attention to the fact that the putrefaction of organic substances was due to these minute living bodies, and that putrefaction and fermentation were essentially one. The weighty authority of Liebig was opposed to this view, and Helmholtz, after a time of wavering, finally ranged himself against Schwann. It was in 1856 that Pasteur began the series of experiments which demonstrated finally that micro-organisms were the cause of fermentation and of putrefaction, and that for each form of fermentation studied by him; yeast fermentation, lactic acid fermentation, butyric acid fermentation, there was one specific cause, and only one.

Lister had long been working on the problem of inflammation, and of the decomposition of wound discharges. When therefore early in 1865 he read of the work of Pasteur his mind was prepared to receive the new evidence, and to put it to the proof in the treatment of surgical cases. It is impossible for us now to realize the horrors and the mortality attached to surgical work, at the period when Pasteur's papers were written. In almost every case the discharge from a wound underwent putrefaction; inflammation of varying degrees of severity attacked the wounds, pus poured from their surfaces, and hospital gangrene, erysipelas, and pyæmia, the most desperate form of blood poisoning, occurred with terrible frequency. The clean healing of a wound, by "first intention" rarely occurred. A surgeon was more than content, he was eager and gratified to see a thick creamy discharge of "laudable pus" from the surfaces of a wound. Very few operations were performed, and then as a general rule only in cases where death, or extreme disability, was otherwise certain.

Limbs were amputated when smashed or so diseased as to be worthless and dangerous; the mortality from amputations varied from 40 to 50 per cent. In Lister's hands, up to the year 1865, in 15 cases of excision of the wrist-joint by his own method, 6 patients suffered from hospital gangrene and 1 died from pyæmia. Volkmann, one of the earliest of Lister's disciples, had results so ghastly that he decided to close his hospital altogether for some months. Lister's own account of his wards at Glasgow is disturbing and distressing even today. The most vigorous and robust patients were swept away after the most trifling injuries or operations, and septic diseases were so frequent and so deadly that the very name of hospital was dreaded by every sufferer. John Bell, a great surgeon, spoke of the hospital as a "house of death."

In the paper which Lister had read, Pasteur asserted that "the most far reaching of my researches is simple enough, it is that putrefaction is produced by living ferments." He asserted that the oxygen of the air was not the cause of putrefaction, as everyone hitherto had supposed; that indeed some of the causes of decomposition could thrive only in the absence of oxygen. This observation which distinguishes "aerobic" from "anaerobic" organisms is of the first importance. Lister at once realized the significance of this work in connection with the changes occurring in wound discharges and on wound surfaces. In 1867, he wrote: "When it had been shown by the researches of Pasteur that the septic property of the atmosphere depended, not on the oxygen or any gaseous constituent, but on minute organisms suspended in it, which owed their energy to their vitality, it occurred to me that decomposition in the injured part might be avoided, without excluding the air, by applying as a dressing some material capable of destroying the life of the floating particles." He proceeded to make trial of the hypothesis in his own work. At this time he had heard also of the experiments made at Carlisle with the disinfection and deodorization of sewage by German creosote, a crude form of carbolic acid. The administration of a very small proportion of this substance not only prevented all odor from the lands irrigated, but destroyed the entozoa which usually infest cattle fed upon such pastures. This was the preparation he decided, after trying chloride of zinc and the sulphites, to rely upon in his early trials.

Among surgical cases then, as now, the sharpest distinction was drawn between simple and compound fractures; between fractures, that is, where the soft parts are almost unhurt, and the skin unwounded, and fractures in which a wound through the skin and soft tissues reaches the broken ends of bone. In simple fractures, life was rarely or never in jeopardy; in compound fractures, putrefaction of wound discharges occurred, septic processes became rampant and the mortality was high. "The frequency of disastrous consequences in compound fractures, contrasted with the complete immunity from danger to life or limb in simple fracture, is one of the most striking as well as melancholy facts in surgical practice." These were the opening words of Lister's first paper on the "new methods" in the *Lancet*, in 1867. The first trial of this method proved disastrous owing to improper management, but the second attempt on August 12, 1865, proved perfectly satisfactory, and was followed by others which more than realized Lister's most sanguine expectations. Compound fractures healed and united as easily and quickly, and almost as safely, as simple fractures. The method proved by so stern a trial was soon applied to cases of chronic abscess, and by degree to operation wounds. In one of his earlier papers Lister wrote: "Admitting then the truth of the germ theory and proceeding in accordance with it, we must, when dealing with any case, destroy in the first instance once for all any septic organisms which may exist within the parts concerned; and after this is done, our efforts must be directed to the prevention of the entrance of others into it." This statement shows that Lister laid down the two essential principles of antiseptic system, the prophylactic and the therapeutic.

Lister's work, it is evident, was the result of research carried out both by the inductive and by the deductive method, and tested and confirmed by many experiments. He

combined in full measure the wide, patient, penetrating inquiry, the comprehensive generalization, and the sound wisdom of the method of Hippocrates, with the demand for experimental illumination or proof afforded by the method of Galen, of Bacon, and of Harvey. He combined in his own work the best of all the schools, and it was no accident that the greatest of all discoveries relating to the science and the art of surgery was made by him.

If a man's services to humanity are the standard by which we measure his value then Lister may be counted as perhaps the greatest man the world has ever produced. For he has been the means of abolishing, or assuaging, the sufferings of men and women to a degree which is quite incalculable, and as I said of him years ago, he has been the means of saving more lives than all the wars of all the ages have thrown away.

As the result of Lister's work the way was cleared for an immense and immediate advance in surgical practice, and for an extension into regions that before had been denied even to the most intrepid surgical adventure. The result is known to all the world. Diseases which were beyond the reach of any are now within the grasp of all surgeons. Operations whose mortality even 25 years ago was so heavy as to be almost prohibitive are now performed with a frequency and with a degree of safety which never cease to excite our wonder. But Lister's work did something else; it showed how research for the future must be conducted if our progress were to be both enterprising and safe. It showed that clinical research and experiment must forever run together.

The achievements of clinical research have been gigantic since Lister's day. The safety which he brought into all our work resulted in an advancement, little by little, of the attack upon the diseases of internal organs, and it exercised in consequence a very powerful, germinal influence upon internal medicine. If our knowledge of the disease of the abdominal viscera of 30 years ago is compared with that of today the truth of this statement will appear. In connection with the diseases of the gall-bladder and bile-

Michael Servetus

ducts the work of Courvoisier published in 1890 is a complete record: it is indeed one of the most monumental works ever produced in surgical literature. What was known then, in comparison with now? Nothing of the early symptoms of gall-stones, of the relation between them and visceral and other infections, nothing of the symptoms due to the impaction of stones in one or other of the ducts; almost nothing of the possibilities of safe relief by surgery. Lister's work has not only been the means of relief to the patient, in his agony; but has been the instrument by which our own most prolific inquiries into the symptomatology, etiology, and, in no insignificant degree, the pathology of this disease has been made. Of gastric ulcer as distinguished from cancer of the stomach our knowledge 30 years ago was trivial compared with what it is today. Much of the teaching of those days is not confirmed by the surgical inquiries of today; and it is now I suppose admitted universally that unless the physician

William Harvey.

is guided by the principles of diagnosis discovered by the surgeon and the radiographer he will stray wide from the path of truth. So, too, of duodenal ulcer, our present knowledge of which is due entirely to the clinical research made possible by safe surgery. And the list might be greatly extended. Much more remains to be done. We are only on the threshold of our inquiries as to the complementary action of one organ upon another; of the relations, for example, of the pancreas, spleen, and liver to each other; and of all, or any, of these, to parts, or to the whole, of the alimentary canal, and to the organs possessed only of an internal secretion. Clinical research involves and implies the fullest inquiry into the detailed character of all present symptoms; the most searching pursuit after those earliest departures from smooth and normal action which observation can discover, the correlation of all these with the manifest changes observed at all stages in the several organs during operations upon any of them. When all this knowledge has slowly and patiently been garnered, then the method of experiment must be used to carry our inquiries still further, and to help us to answer the question: "How do these things happen?" Clinical research will tell us of the changes in other organs associated with the one to which our main inquiry is directed, but a process of deduction and an inquiry by experiment are necessary before we can disclose the sequence of events which culminate at last in the disease we set out to study. The clinical research is beyond question the more arduous. The factors which enter into it are so many, so variable, so impressed by the changing conditions and moods and circumstances of the patient that only the most indefatigable patience and the most trained capacity can help to resolve the matter into simple terms, to dissociate what may be an infinitely complex grouping of many facts before we can rearrange them in appropriate sequence of process or of time. We must discover the "usual conditions," obtain our general notions, observe carefully a multitude of facts, arrange them in orderly fashion, employ the mental act which will bring them together as elements in a great truth. When this is done, and only when this is done, can the deductive method of Galen be employed to fullest advantage. Experimental research is not so baffling a task. Great ingenuity in the devising of experiments may be found in the supreme masters, Pawlow, Almroth Wright, and a very few others. But each experiment often contains only the one question to which the answer is sought. The answer is "yes" or "no," or is expressed in simple terms and it is free from those infinite perplexities, and changing proportions which distinguish the answer given to any inquiry, even the simplest, in the method of clinical research. When in a simple experiment the answer is given a new problem may arise suggesting a further experiment. Thus a chain of experiments may develop, each of

Harvey demonstrating the circulation of the blood to Charles I.

which answers not only its own question, but contributes in its own degree to the final answer embracing the entire sequence of experiments. The single experiment may be simple. But in respect of a series, each member of which is dependent upon its predecessor, and provokes its successor, and all of which illuminate or decide some problem suggested by clinical research, nothing has been done in surgery comparable to that which in chemistry has been achieved by Fisher and Abderhalden.

These brief glimpses at the progress of surgery show that its epochs may be considered as three in number.

In the first and longest the writings of Hippocrates and Galen were regarded as an inspired gospel. By them the minds of men were held captive, and their imagination enslaved, and every new adventure in thought or action suppressed or cramped. To seek in them for knowledge was all the effort of every man. What was written in them was truth, what was outside them rank heresy. Where the meaning was not as plain as day the most endless inquiry and discussion ensued. The controversies which then shook the intellectual world to its very foundation, are seen now to be only laughable both in their methods, and in their quaint decisions. In later ages to challenge the truth or the final revelation of any teaching of Galen's was almost blasphemous, and it required a rare and reckless courage to say, as did Henry of Mondeville: "God did not surely exhaust all his creative power in making Galen." The prophets and seers, who little by little, and with very needful caution, led the world through this black night, death's second self, into the dawn, were the anatomist, Mondinus, Vesalius, Fabricius, Fallopius, and others. By their work the assertions of the old scriptures could be openly gauged. In gross anatomy a structure stands out for all to see. If Galen's teaching denied the truth disclosed by dissection it was most gently and tentatively refuted, heretical and perilous as such a work might be. And as normal anatomy grew it was joined by morbid anatomy, and at last came Morgagni and Hunter. They established the second great era in which the pathology of the dead was studied with a

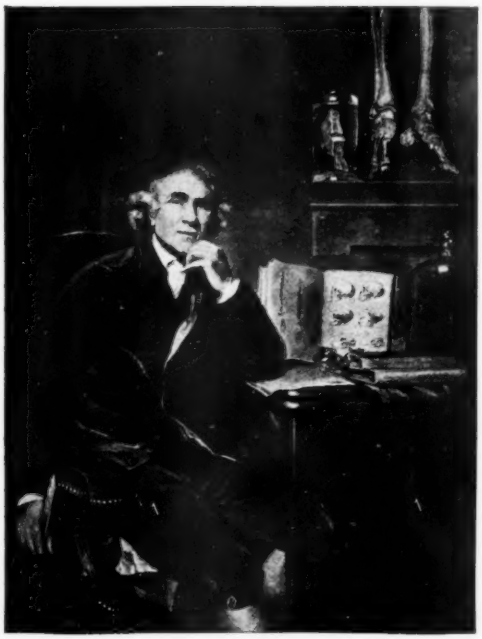
Richard Wiseman. From a miniature in possession of the Duke of Rutland.

Ambrose Paré. Councilor of state and surgeon-in-chief to Henry III, of France.

wealth of care and inexhaustible patience. The gross lesions of morbid anatomy, and even many that were recondite and remote, were examined, described, discussed, and arranged in due order, by a mighty succession of able men, whose work today we too lightly neglect. Clinical medicine and surgery were dominated by the knowledge of the morbid processes discovered in this time. Symptoms were correlated with the signs found upon the postmortem table, and upon the shelves of museums. Clinical histories were largely devoted to terminal conditions, for it was only these that brought a patient to a hospital where he died, and where an autopsy could be made. But patients do not die in hospital from the diseases from which they suffer long during life. And in consequence severe limitations were set to our knowledge of disease of all kinds.

Lister's work made possible the third era which depended for the swift and notable advance upon a study of the pathology of the living, upon a study, that is, of morbid processes in their course rather than when their race was fully run. By multiplying observations made during operations we learned, little by little, how to capture a general truth from a series of individual examples. By slow degrees and grudgingly it was admitted that terminal manifestations of disease and the advanced ravages of morbid anatomy did not constitute all medicine; that earlier symptoms were to be referred to earlier changes in organs exposed during the course of operations. And these changes and symptoms we now realize are themselves but late; still earlier manifestations of aberrant action are being sought patiently and with a success that holds increasing hope for future work.

During all these three periods through Galen, Vesalius, Harvey, Bacon, Hunter, Lister, there has run a vein of experimental



John Hunter.

John Hunter.

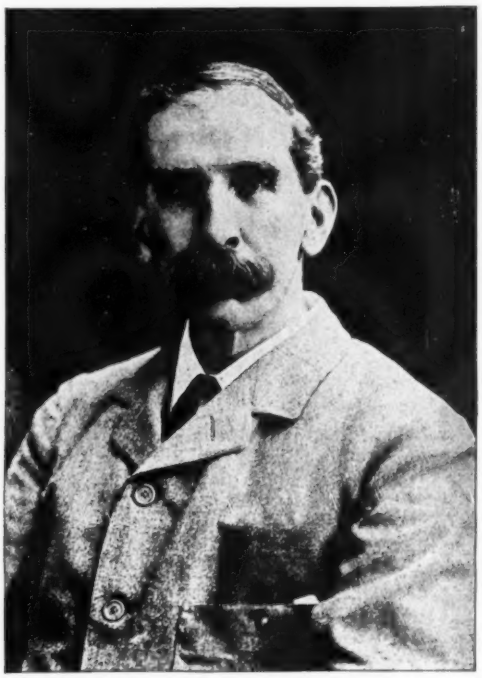
work, testing hypothesis and discovering new truths. Since Lister's day there has been a steadily increasing recognition of the value of such work and of the urgent necessity of continuing it, of enlarging its field so that it may be coterminous with medicine itself. We are indeed newly entered upon another stage, the stage of combined research in which clinical observation, inductive and deductive processes of reasoning, and experimental inquiry are linked together. In its progress so far, the work of a few men stands out as of the utmost significance. Horsley's work upon myxœdema, cretinism, and on the functions of the thyroid gland; Ferrier's, Macewen's, and Horsley's researches upon cerebral affections and cerebral localization; Senn's work upon the pancreas and upon the intestines; Kocher's work upon cerebral compression, and upon the thyroid gland; Crile's work upon shock and upon blood transfusion; and Harvey Cushing's work upon diseases of the brain and the pituitary gland. Since Lister rid all operations upon man and upon animals of their former terrors, many surgeons have turned to experiment in order to perfect and to illustrate their own work, to test an hypothesis, to search for new procedures or to discover an explanation of clinical phenomena whose meaning was difficult to unravel. In recent days few men have displayed so vast a range of clinical interests, so keen a zest for relevant experimental inquiry, so logical a mind, such frank intellectual honesty as Murphy. He may justly be ranked as one of the earliest and one of the greatest exponents of the method of combined research.

Murphy's first work to attract the attention of all surgeons was that which led him to

L. Pasteur.

devise and to perfect the most exquisite surgical implement that has ever been invented "Murphy's button." Up to the time at which experimental work on the anastomosis of hollow abdominal viscera was begun by Senn, Murphy, and others, the method of securing union was difficult, tedious, and unsafe. I well remember to have seen the operation of "pylorectomy" done in the year 1889. A very niggardly removal of a small "prepyloric" carcinoma was made, and the cut end of the duodenum was united to a part of the divided end of the stomach after the first method of Billroth. We counted over two hundred sutures used to effect the junction. Each suture was of silk; for each the needle was separately threaded, the suture passed, tied and cut; a wearisome total of movements of the surgeon and his assistants, involving a great expenditure of time. No wonder the surgeons searched for simpler methods. Senn's bone plates, the first mechanical apparatus to assist in an anastomosis, were ingenious instruments not very easy to use, requiring a not inconsiderable degree of skill and patience to secure that the threads holding them were well and truly tied, and calling also for the introduction of a number of additional sutures. The results following the use of these instruments were sometimes very good and sometimes very bad. While surgeons were struggling with this tiresome and unsatisfactory implement, Murphy introduced his "button." It was the result of a great deal of experimental work done upon dogs, in the early hours of the morning, and in the lean years of his early married life. In this work Mrs. Murphy took her share, giving chloroform to the animals. A few people were privileged to know of the boundless help and inspiration which Mrs. Murphy gave her husband in those hard, but happy days when he was struggling for his place in the work of surgery. His wonderful success was in no small way due to her sympathy, encouragement, and unfaltering belief in him; and to the eager enthusiasm which she showed in all his work. His fame was her fame also. As I offer to him my tribute of laurel for honor and of rosemary for remembrance, it is an added pride that I can do so in her presence. With the help of Murphy's button, operations which had been difficult and perilous at once became so simple that the merest tyro could perform them, and the risk of all operations fell with amazing rapidity. The button was used in every clinic, and upon all occasions where visceral anastomoses had to be effected; and the name and the fame of Murphy traveled round the world. But I still think that the great virtue of the button was not in its own direct use but in the convincing demonstration it gave to us of the essential simplicity of the process of visceral union. By using the button we learned how safely and how rapidly the peritoneal junction took place; there was no need, it was now perfectly evident, for the hundreds of stitches that all surgeons were using. Firm, even approximation for a very few days, would lead, the button showed beyond a doubt, to a permanent and secure fusion of the apposed viscera. The

Lord Lister.



Sir Victor Horsley.

button itself was occasionally a danger. After the operation of gastro-enterostomy it sometimes remained for many months in the stomach; when it passed on to the lower intestine it might cause obstruction, or it might ulcerate its way through the intestinal wall. We learned from the use of the button not that the button itself should be used, but all the secrets of the principles of entero-anastomosis. It is not the least exaggeration to say that Murphy revolutionized the methods of visceral anastomosis, and was partly responsible for giving that impulse to abdominal surgery which in later years has carried it so far. A characteristic example of his method of approaching a surgical subject to which he desired to contribute is shown in his work on "Ankylosis," which he began in 1901. Up to that time the treatment of stiff joints was unsatisfactory and in cases of severe ankylosis, whether bony or densely fibrous, was almost hopeless. Murphy says he proposes to begin the study of his subject by some questions. "What are joints? What is the embryology of joint formation? What is the pathological histology of acquired arthoses of false joints? What is the pathology of hygromata (acquired endothelial lined sac?) Can they be produced artificially? What is ankylosis? What are the pathological and anatomical changes included in the term? What tissues are involved? From a practical standpoint, into what classes may it be divided? When ankylosis has formed what are the limitations of surgery for its relief? Can we re-establish a movable, functionating joint with synovial lining? Can we restore motion and to what degree? In what class of cases can the best results be secured? Can we for the future promise better than the flexible, fibrous unions that we have secured in the past?"

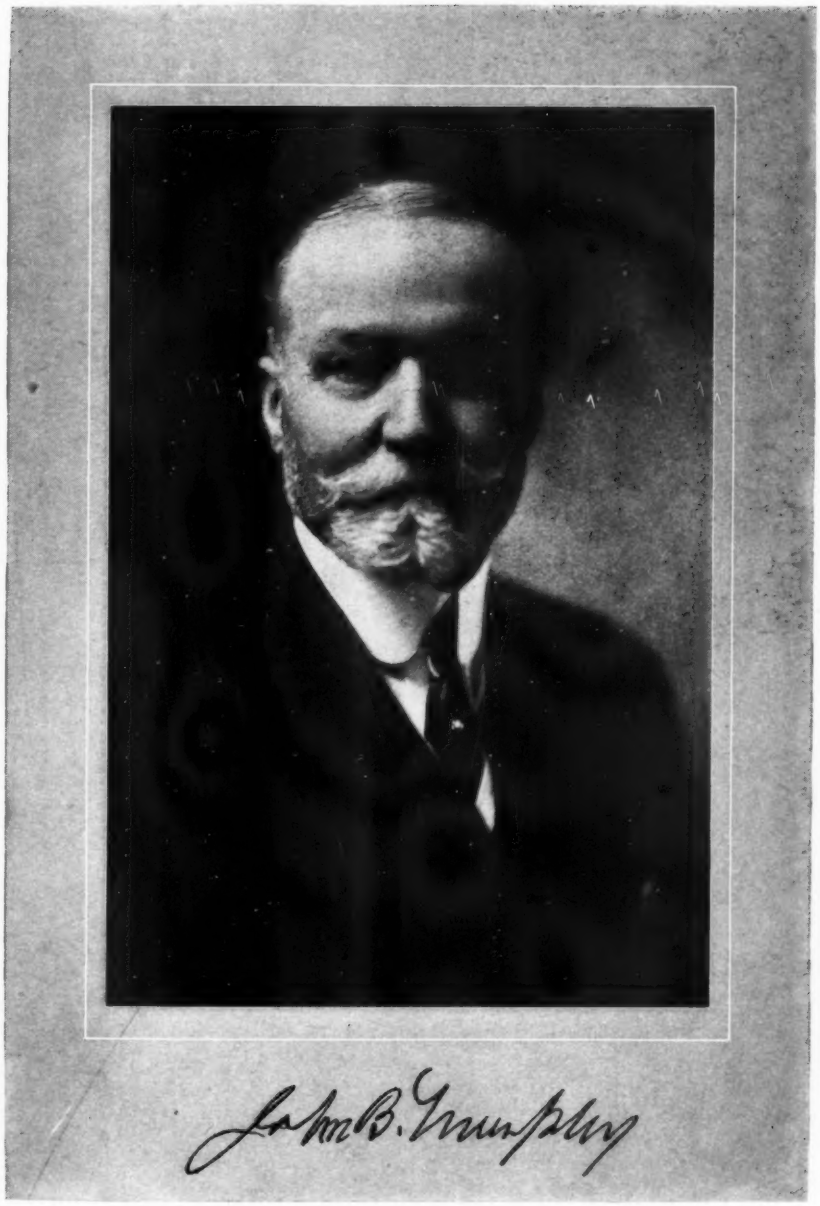
He then discusses the development of joints in the embryo, and the method of bursa formation in early and in adult life, shows that hygromata and ganglia are the

Nicholas Senn.

products of the liquefaction of hypertrophied connective tissue, and indicates that in an artificial development of joints all the facts relative to these processes should be utilized. The formation of "false joints" as a result of non-union in fractures of the long bones, led to the recognition of the pathological condition whose counterpart was provoked in the operation of arthroplasty, in which a foreign body was inserted between the end of bones separated at an ankylosed joint, to prevent re-union and to cause the development of a new joint. He then investigates the matter by experiments upon dogs, and proceeds to demonstrate its efficacy upon men afflicted by bony ankylosis of their joints. The whole piece of work is an exemplary instance of the combination of clinical experience and of experimental research leading to the establishment of a new method of treatment in a severe and most disabling condition.

In 1897, Murphy published his article, "Resection of Arteries and Veins Injured in Continuity. End-to-End Suture; Experimental and Clinical Research," in which for the first time he established the principles, and described one of the methods, of arterial suture and anastomosis. As in other articles clinical needs indicate the lines of his experimental inquiries; and a widening of the bounds of surgical endeavor and practice is the result. In 1898, he delivered at Denver the oration on surgery before the American Medical Association and chose as his subject the "Surgery of the Lungs." Independently of Forlanini he suggested the injection of nitrogen into the pleural cavity in cases of hopeless unilateral disease of the lung. No enthusiastic acceptance greeted the suggestion. Murphy himself extended the method in his later work to cases of incipient tuberculous disease; and recent experience has fully justified all his claims and has given sanction to his methods. He again combined clinical experience and research by experiment in his work on "Surgery of the Spinal Cord," published in 1907, and his final summary on neurological surgery in SURGERY, GYNECOLOGY AND OBSTETRICS, 1907, iv, 385, was the most accurate and concise survey of our knowledge of this subject which had then been published.

Wherever we turn we find his method to be the same. A wide survey of the subject to be discussed made interesting by the personal magic that he was able to throw into it; a disclosure of the gaps in our knowledge; a suggestion as to the means by which that knowledge or a want in our technical methods can be made good; a record of experiment to elucidate or to solve a difficult point; a wealth of clinical observation and a formidable array of arguments, lead to an inevitable conclusion stated in terms that none could fail to comprehend. In every article of his that we read we can see the working of an orderly mind, of a mind most eager for new truths, and expectant of them. For every subject he seems to have a mental scaffolding by which he guides and arranges the truths as they are fashioned and duly laid in place. He had a zeal for classifications which looked complex



John B. Grumpley

but when carefully considered tended to simplicity and to easy and ready remembrance. Of his other surgical work and of his high minded endeavor to seek for and to secure the purity and advancement of his own profession I need say nothing. It is a record of sincere and honest devotion to his duty as he saw it before him. Great deeds are born of great zeal and high resolve; and he was lacking in neither. All that he did is within the recent memory of his colleagues here. My immediate purpose has been fulfilled if I have sketched, however roughly, the giant figure of the man and the surgeon whose work was done among you and whose fame has spread out into all lands. Our calling by common consent, the noblest of any, dignifies all who join its ranks. The honor of the profession is the cumulative honor of all who both in days gone by and in our own time have worthily and honestly labored in it. In every generation there are a chosen happy few who shed a special lustre upon it by their character, their scientific attainments, or the great glory of their record of service to their fellow men; for it is, as Ambrose Paré said, "beautiful and the best of all things to work for the relief and cure of suffering." In our generation Murphy was one who by his full devotion, his complete surrender to its ideals, and by his loyal, earnest, and unceasing work, added distinction to our profession, which, in return, showered upon him the rewards with which no others can compare, the approbation of his fellow workers and the friendship and trust of the best among his contemporaries in every country.

> "The mightier man, the mightier is the thing
> That makes him honoured."

As we look backward upon the long history of the science and art of medicine, we seem to see a great procession of famous and heroic figures, each one standing not only as a witness of his own authentic achievements, but also as a symbol, of the traditions, ideals, and aims, of the age which he adorns. The procession is sometimes thinly stretched out, or even rudely broken here and there; but, in happier ages it is thronged by an eager and exultant crowd. In medicine the whole pageant is as noble and splendid as in any of the sciences or arts, and it reveals the collective and continuous genius of a band of men inspired by the loftiest purpose, and lavish in labor and sacrifice for the welfare of mankind. They have come throughout the ages from every land. They now belong not to one country but to every country for they are the common possession and the pride of all the world. They have lost their nationality in death. They are men whose deeds will not be forgotten, and whose names will live to all generations. Among such men, few in numbers, supreme in achievement, John Benjamin Murphy is worthy to take his place.

IMMOBILIZATION OF THE PROXIMAL FRAGMENT IN FRACTURE OF THE JAW ABOVE THE ANGLE

By W. T. COUGHLIN, M.D., F.A.C.S., St. Louis
Professor of Surgery, St. Louis University

IN the fracture of the lower jaw as in fracture of any of the long bones, it is true that the shorter the proximal fragment, the less is one able to control it by external fixation apparatus.

The rule for reduction and retention in fractures in the long bones when one can not control a proximal fragment is to place the distal (controllable) fragment in such a position that it occupies as nearly as possible its normal relation to the proximal (uncontrollable) fragment and retain it in this position until consolidation occurs.

In a fracture of the lower jaw at or above the angle, as in fracture in other bones, the primary displacement of the fragments varies with the force, and with the direction of the application of the force, while the secondary displacement will depend for its causation on muscle pull or later on the pull of contracting scar.

When the fracture line lies through the angle, i. e., running obliquely downward and backward or when it lies in front of the angle running downward or downward and forward from just behind the third molar region, reduction and retention are seldom difficult: first, because the displacement is never very marked, second, because the fragments can be easily grasped by the reducing fingers, and third, because the proximal fragment being longer is more readily controllable by a "saddle" molded to fit over the anterior (submucous) margin of the ramus and depending for its "point of support" on "cap" or "gutter" splint fastened on either lower or upper teeth.

But when the line of fracture runs through the ramus, above the level of the upper border of the body of the jaw, the case is different.

The temporal muscle is attached not only to the coronoid process but also to the anterior aspect of the ramus, almost if not quite all the way down to the point at which it joins the body. This muscle draws strongly upward or upward and backward on the coronoid in fracture through the ramus above the level of the upper border of the body. And as it draws upward and backward on the coronoid, this causes the lower end of the proximal fragment to travel forward, as the pivotal point is the condyle.

The internal pterygoid is attached to the internal aspect of the jaw at the angle and some of its fibers are attached to the inner aspect of the ramus as high up as entrance to the inferior dental canal, in fact its attachment somewhat corresponds on the inner aspect with that of the masseter on the outer aspect. It draws the angle inward and forward as well as upward; but those of its fibers which insert into the inner aspect of the ramus, above the level of the upper border of the body, when they exist above a fracture line, draw the proximal fragment inward and forward.

The masseter tends to draw the angle forward and upward, but the malar and zygoma from which its fibers take origin, are placed in most persons, farther lateral than are the angles. Their point of insertion, and, therefore, the pull of the masseter, is slightly outward as well. If now any of the fibers of the masseter are inserted into the proximal fragment, they pull upward and forward and outward on it.

We have, therefore, three muscular forces pulling upward and forward on the proximal fragment, the temporal, the internal pterygoid, and the masseter.

Opposed to the action of these is the action of the external pterygoid. But the action of the external pterygoid is overcome by the forces opposed to it. And thus it happens that when the displacement of the proximal fragment in fracture at or above the angle is due to muscle pull, the lower end of this fragment is carried forward in all cases and most often forward and inward. If reduction and fixation be not accomplished, the muscles named,

Fig. 1. Line of incision.

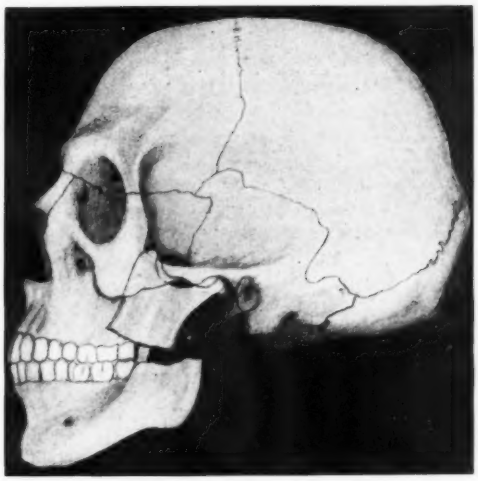


Fig. 2. The proximal fragment is drawn forward by the pull of the temporal muscle, etc.

continuing to overpower the external pterygoid cause the proximal fragment to travel forward until its anterior margin, or perhaps its lower end lodges against the upper jaw or even against the under aspect of the malar.

This may lead to mal-union, vicious union, or even to non-union and, therefore, the surgeon seeks to overcome it at its earliest beginning. Of course, it goes without saying that all fractures of the ramus are not followed by such displacement.

As said before, when the fragment is long, the line of fracture being low or through the body, all that is needed to secure retention is to apply a molded "saddle" against the anterior margin of the ramus and fix this "saddle" to either upper or lower teeth and close the jaws. Any dentist can make such apparatus, and in passing I wish to say that no surgeon who has the best welfare of the patient at heart will try to carry such a case through without the aid of the dental colleague. However, when the fracture is higher up no "saddle" can be applied. When the mucosa in the region of the fracture is much lacerated, the "saddle" causes too much discomfort, and also its presence interferes with healing of the soft parts.

In such cases resort has been had to open operation and wiring or plating. This, however, is an operation of some magnitude, and it has been followed by serious consequences, and even by death.

Pickerill devised a scheme for the easy control of the fragment. It consisted in driving a screw through the zygoma so as to catch the underlying coronoid and pass through it while an assistant held the fragment in reduction. I tried the method once and did not find it quite so satisfactory as Mr. Pickerill does inasmuch as in that case, as very often happens, the coronoid did not extend up high enough to be caught by the screw. I have a friend who not being able to get the screw to "fix" in the coronoid was forced to wire the process to the zygoma. In both this and the method of Pickerill, there is more work than there is in the method I advocate, and the operation is more serious.

I thought that perhaps a nail passed close to the under border of the zygoma and close in front of the neck of the condyle would serve the purpose, I tried it once but it failed. I then tried passing the nail (ordinary wire nail about an inch and one-half long) close

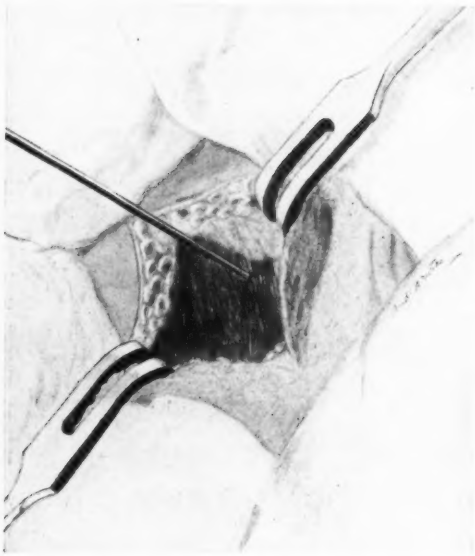


Fig. 3. Locating the depth and position of the coronoid with a needle.

in front of the coronoid and close under the edge of the malar. In both instances the nail was passed until the head could be easily buried under the skin. In both cases it failed entirely to prevent the forward movement of the fragment.

The method here illustrated has been used by me now in four different cases and with a good result in each. Only local anæsthesia is necessary and the operation is a very minor one. After anæsthetization of the area, one who is not quite sure of the anatomy would do well to locate the depth and position of the coronoid by sounding for it with a needle. The incision should lie parallel with the fibers of the facial nerve which go to the frontalis and upper half of the orbicularis palpebrarum and should extend only through the skin. The upper one-quarter of it overlies the zygoma, the remainder of it reaches from one-half to three-quarters of an inch below it. It is not more than 1 inch in length.

A needle or probe is passed close to the zygoma, down through the masseteric fascia and the masseter muscle until the coronoid is felt. A closed scissors is passed alongside this

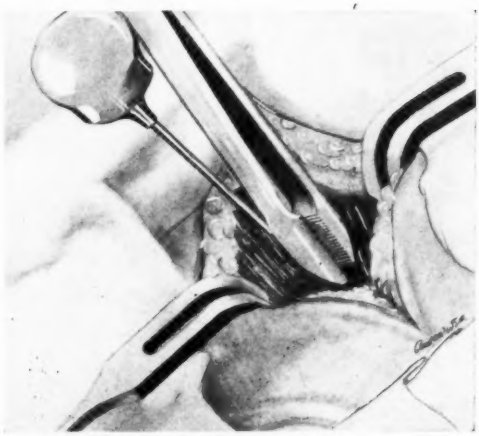


Fig. 4. A scissors or pointed artery forceps is introduced along the probe or needle and opened so as to split the fibers of the masseter.

probe until the point of the scissors rests against the coronoid. I like a pointed scissors with long strong handles. The probe is withdrawn and pressing the point of the closed scissors firmly against the coronoid the scissors are opened, splitting the fibers of the masseter from the zygomatic border downward for an inch. Two small strong retractors are passed into this slit and, holding their ends firmly against the coronoid, retraction of the split masseter is made and the scissors are withdrawn.

An assistant passes his finger into the mouth and makes reduction. He then holds the fragment reduced while the hole is being drilled and the nail being passed. The nail should exactly fit the hole. The hole is drilled through the tip of the coronoid as close to the edge of the zygoma as possible.

The nail I have used is an ordinary wire nail with a thin flat head and is about an inch and one-half long. It is passed straight in until its head impinges on the outer surface of the zygoma. If it is turned up very slightly its point soon comes into contact with the under surface of the skull and it may not go far enough. When it is properly passed, it effectively prevents the coronoid from rising as the nail catches at one end under the zygoma and its point comes into contact with the base of the skull. The wound is closed

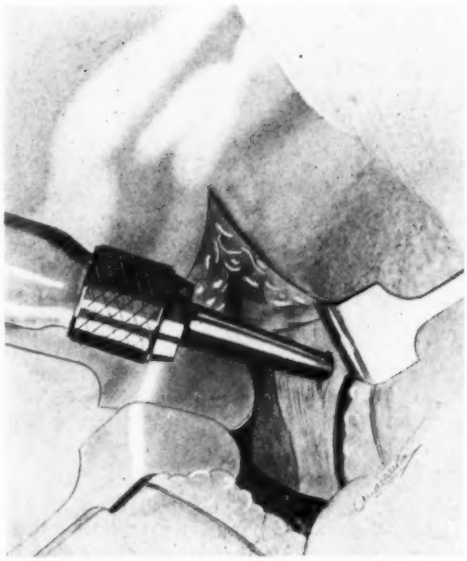


Fig. 5. The fragment is held in reduction while a hole is drilled through the coronoid just below the zygoma.

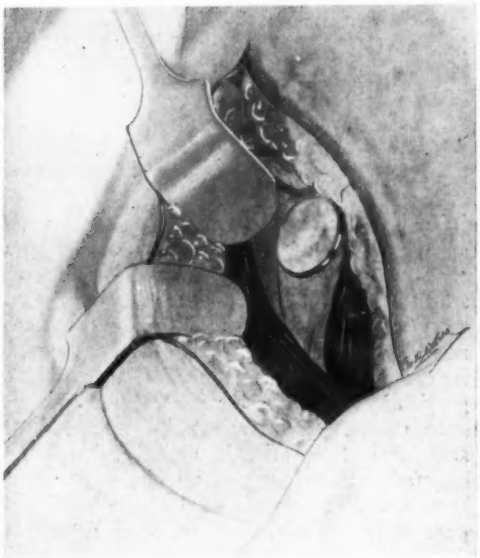


Fig. 6. The nail is passed straight in through the hole until its head impinges on the outer surface of the zygoma.

with figure-of-8 silkworm-gut through the masseteric edges and overlying structures. These control any oozing and there is no need of burying either ligature or suture material.

The jaw is then immobilized and for this kind of fracture I always use "closed bite."

The nail is removed after 4 weeks and comes away very easily. Some granulation tissue has always been present in the parts surrounding the nail and twice some brownish fluid has been found. The cultures have always been negative. A patient on whom I did a bone graft, wore the nail for more than 2 months without ill effect. This nail had been tinned for me by Captain (later Major) Lankford, D. C. A silver nail would be better perhaps but the ordinary wire nail is the only kind I have used.

MANAGEMENT OF THE CERVICAL STUMP AND THE ROUND AND BROAD LIGAMENTS WHEN PERFORMING SUPRAVAGINAL HYSTERECTOMY

By DOUGAL BISSELL, M.D., F.A.C.S., New York City
Attending Surgeon, Woman's Hospital

IT is not my purpose to review here the development of the technique of supravaginal hysterectomy or intra-abdominal amputation of the corpus uteri. History has recorded the names and individual achievements of each operator who has contributed to its completion, and to them we owe a debt of gratitude. Further comment is unnecessary, save to note that the final chapter in the standardization of this technique was not enacted until the uterine arteries were ligated separately. Prior to the adoption of this particular feature, the mass ligature was used about the cervix, which resulted in depriving the cervical area above it of blood supply and in necrosis. The essential features then in the standardization of the technique are the return of the cervical stump, covering it with peritoneum and ligating separately the uterine arteries. Until this last feature was introduced, the technique for supravaginal hysterectomy could not be considered as standardized. Various ways have since been adopted in dealing with the cervical stump and ligaments, but they are all nonessential modifications and neither add nor take away from the principles established years ago.

Before considering special surgical features with regard to the management of the cervical stump and the round and broad ligaments, prophylactic treatment of the cervical canal should be given consideration.

There are valid objections, theoretically at least, to the use of an intra-abdominal cleansing alone of the cervical canal for the obvious reason that the instrument which severs the cervical tissue necessarily becomes contaminated while crossing the unsterilized cervical canal. Practically, however, the field is seldom so contaminated as to prove disastrous, but as the possibility of serious results always exists, the risk should be avoided if possible and an effort made to insure surgical cleanliness of the canal prior to operation.

Several methods are in use today of preparing the cervical canal per vaginam prior to operation. Among these we find advocated the application of a 3.5 to 7 per cent tincture of iodine, a 5 or 10 per cent solution of nitrate of silver, and pure carbolic acid followed by alcohol.

The application of any of these chemicals by means of a syringe would seem unwise unless the cervical canal has previously been well dilated, as their injection into the cavity otherwise may drive the fluid through the fallopian tube with resulting chemical trauma to the peritoneum.

A comparative macroscopic study of the action of these chemicals on the uterine mucosa can be easily made by applying them to the lining membrane of a removed uterus which has been split open. Under these circumstances, it will be observed that the iodine exerts marked action on the lining membrane of the uterine cavity but comparatively little action on the cervical mucosa whereas nitrate of silver and carbolic acid have an immediate and profound action on both. Neither nitrate of silver nor carbolic acid in the limited quantity applied affect deeply the mucosa of the many folds of the cervical canal, nor penetrate deeply the glands but as their action appears more extensive on the mucosa of the cervical canal than does iodine, either chemical would seem to exert a greater protective influence. My personal preference with regard to preliminary treatment of the cervix is the application of pure carbolic acid on a small cotton probang to the entire cervical canal followed by the application of alcohol. Whether the cervical canal has been treated prior to operation or not, the application of carbolic acid followed by alcohol to

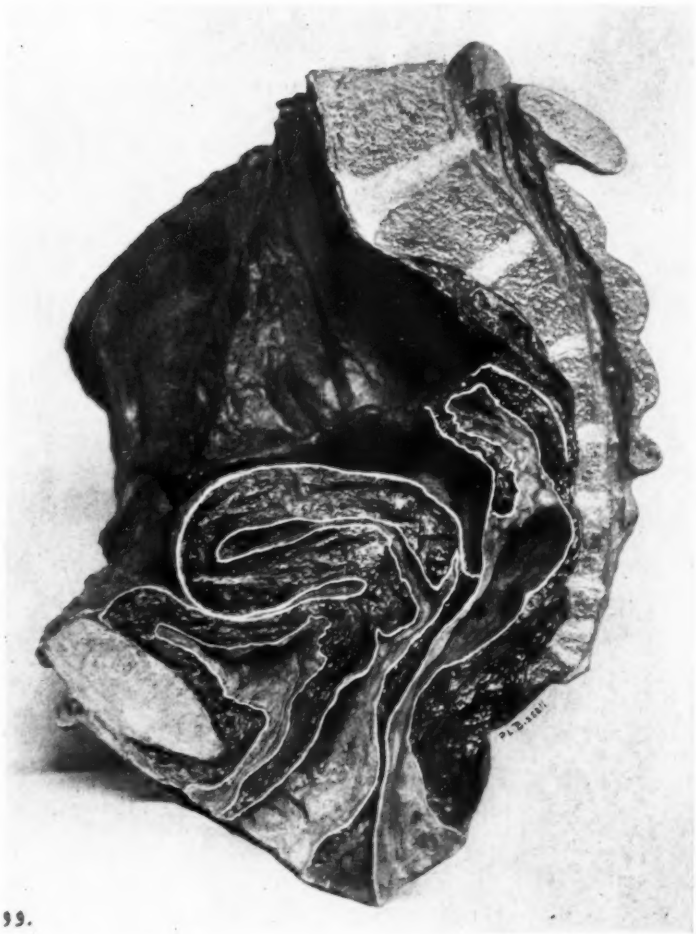


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Fig. 1. Retouched photograph of a plaster cast of a sagittal section of a frozen female pelvis. The inclination of the pelvis is according to Naegele's findings and constitutes what is recognized as the normal position of the pelvis in the erect posture. Under these conditions with the bladder empty and pelvic organs normal the corpus of the uterus assumes practically a horizontal position. The uterine insertion of the round ligament is seen lower than the fixed point of the round ligament where it emerges from the inguinal canal.

the canal after the corpus has been amputated is probably the most serviceable treatment. The actual cautery is, of course, thorough but less convenient.

The methods of approximating the cut surfaces of the cervix and adjusting their peritoneal edges differ but little; all serve equally well if the sutures are placed deep and are sufficient in number to prevent hæmorrhage. The aims should be in approximating these surfaces, exact apposition, insurance against hæmorrhage and economy of both time and material. My preferred plan is to use four or five interrupted plain catgut sutures No. 2; the outer two sutures 18 inches or more in length are tied so as to leave one strand

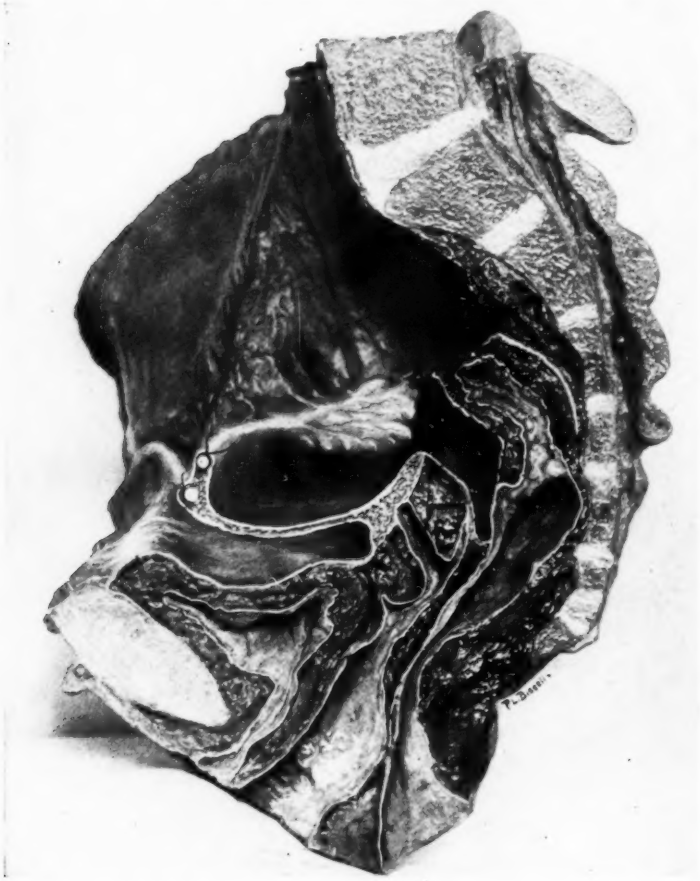

Fig. 2. This retouched photograph is identical to the preceding except that the corpus has been removed. The relationship of the cervix to the coccyx and the symphysis as well as to the cut ends of the round and infundibulopelvic ligaments is here emphasized. That portion of the round ligament emerging from the inguinal canal representing the fixed point of the ligament is on a plane slightly above the center of the cervical stump, the area to which the round ligament is usually anchored.

sufficiently long to be used again as a continuous suture to unite the cut edges of the broad ligaments. In the preliminary work on the lateral ligaments the peritoneum over the round ligament is first incised, the ligament freed from its sheath, tied, and severed. This management of the round ligament assures its retraction well under the folds of the broad ligament. The ovarian vessels are secured independently and at the completion of the operation, the continuous broad ligament suture is utilized in such a manner as to adjust the tied ends of the ovarian vessels between the raw surfaces of the broad ligament; by this technique there is presented along the cut edges of the broad ligament an uninterrupted peritoneal apposition.

Two methods are in vogue regarding the management of the round and broad ligaments with respect to the cervical stump when per-

forming a supravaginal hysterectomy: first, the anchoring of these ligaments to the cervical stump; second, their treatment independently of the cervical stump.

Those who advocate the first plan do so with the idea of maintaining the cervix in its normal position or correcting its displacement if such exists. Those who advocate the second plan believe that the action of the round and broad ligaments on the cervix when so anchored is practically negative and therefore a useless procedure.

Those who advocate the anchoring of the ligaments must differ in their theory of uterine support from those who advocate their independent treatment. The first act upon the theory that the uterus is directly supported and maintained in normal position by the combined influence of the fascial diaphragm and the round and broad ligaments, or by the action of the round and broad ligaments alone. The second believe that the fascial diaphragm alone supports the uterus and that the round and broad ligaments act only on specific occasions as when the bladder is being emptied; and that these ligaments in combination with the tissues in which the cervix is embedded restore the fundus to its normal position below the symphysis.

In combating the claim of those who advocate the anchoring of the round and broad ligaments to the cervical stump, it is necessary to consider briefly first the mechanics of uterine support and the normal function of the round and broad ligament as I conceive them to be.

The primary support of the uterus is the fasciomuscular diaphragm of the pelvis in which the lower segment of the uterus is embedded. This diaphragm consists of all the fascial and muscular structure which separate the urethra and bladder from the vagina, the tissues at the base of the broad ligaments, and those radiating from the cervix to the sacrum. These tissues act conjointly to support the uterus and maintain the cervix in normal position, and any interference with their conjoint action tends to produce a forward displacement of the cervix or prolapse of the entire uterus. The round and broad ligaments are called into action when

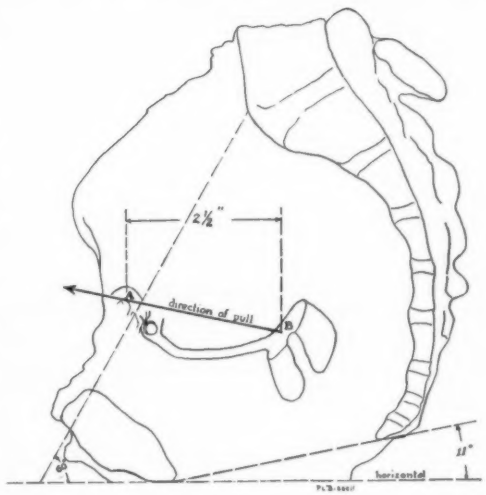

Fig. 3. A schematic drawing traced from the preceding photograph showing the direction of the possible influence on the cervix of the anchored round ligaments.

First, were it possible for the round ligaments when anchored to the normally posed cervical stump to influence the position of the cervix they would have to overcome the combined resistance of the fasciomuscular structures in which the cervix is embedded and by which its normal position is maintained.

Second, if the anchored ligaments exert an influence on the normally posed cervix sufficient to overcome the resistance of the fasciomuscular structures, then the direction of this influence is from the coccyx and toward the symphysis.

Third, if the anchored round ligaments exert an influence on the position of the cervical stump, they do so when the fasciomuscular tissues are lessened in resistance as when injured or overstretched. Under these combined influences the cervix must move toward the symphysis through an arc of a circle.

the corpus recedes, as when the bladder fills, or when some force tends to displace the corpus laterally. Of these lateral ligaments, the round is perhaps the most important. Its structure is in part muscular as likewise is its function. When the bladder fills and the corpus recedes toward the sacrum, these ligaments are stretched until a degree of tension has been reached, which awakens consciousness of discomfort. When the bladder is being evacuated these ligaments act conjointly with the elastic tissues in which the cervix is embedded and restore the corpus to an anterior position. When the corpus has advanced sufficiently anterior to permit the

intra-abdominal force to act directly on the posterior, or properly speaking, superior surface of the uterus the action of the ligaments ceases.

The round and broad ligaments are not in constant action but function occasionally and have long intervals of rest, whereas the fascial diaphragm of the pelvis is in constant action. The function of these ligaments therefore correspond to that of muscle tissue elsewhere and they are capable of standing occasional strain only, whereas the function of the pelvic diaphragm corresponds to that of fascial tissue elsewhere and is capable of resisting constant strain.

As the round ligament contains a greater amount of tissue and probably exerts a greater resisting force than the broad ligament, I will direct my argument against the use of this ligament.

What is the action of the round ligament and what purpose does it serve when anchored to the cervical stump in the operation of supravaginal hysterectomy?

Those who advocate the anchoring of the round ligament to the cervical stump must do so with the idea that the action under these circumstances is constant. Though such action is contrary to nature's plan, let us grant for the sake of argument, that this theory is true. What then is the direction of its action and what effect must it have upon the position of the cervix?

The fixed point of action of the round ligament is at the internal ring or where it emerges from the inguinal canal, and as this point is situated on a vertical plane considerably anterior to that of the cervix, and on a horizontal plane considerably above that of the cervix, the direction of its action must be forward and upward so that if the action of the round ligament, when anchored to the cervix, be effective, the direction of its influence must be toward the symphysis.

If this reasoning is correct, the action of the implanted round ligament produces a result contrary to that desired, for the normal position of the cervix is in the vicinity of the coccyx, and to lift the cervix up or pull it forward, displaces it. If the implanted round ligament influences the normally posed cervix in the direction of the symphysis, how much more must it influence the already displaced cervix in the same direction?

As the combined strength of the round and broad ligaments is comparatively little when contrasted with the resistance offered by the pelvic diaphragm, and as the fascial and muscular tissues of this diaphragm are not in the least injured when supravaginal hysterectomy is performed, it would seem reasonable to conclude that the combined influence of these ligaments when anchored to a normally posed cervix is nil.

Theoretically, it would therefore appear that the influence of the round and broad ligaments, when anchored to the cervix, has no effect on the position of the cervix whether normally or abnormally situated at the time of the operation. But let us approach the problem from a different standpoint. What practical proof have those to offer who advocate the anchoring of these ligaments, that the cervix may descend if the ligaments are not anchored to it or that the ligaments when anchored to it act to insure the normal position of the cervix and prevent the possibility of its descent? The fact that a cervix is found in low position following supravaginal hysterectomy where these ligaments were not anchored, is alone not sufficient evidence to conclude that its normal position is a sequel to the operation and the result of not having implanted these ligaments. Exact data as to its position prior to operation are necessary in forming a conclusion, and more than one instance of such a change in position is required to establish the theory that this change in position is due to not having implanted the ligaments. Nor is the fact that, because the cervix, previously in normal position, has descended after the ligaments have been anchored to it, proof of the utility of the ligaments in maintaining or insuring the position of the cervix.

In the follow-up clinic at the Woman's Hospital, I have examined during the past 2 years and 8 months, 130 cases of supravaginal hysterectomy done without anchoring the round ligaments in the cervical stump; in 127 of these cases the cervix was in normal or practically normal position prior to operation;

in not a single instance was the cervix found prolapsed after operation. In 3 cases, the cervix following operation was found prolapsed with considerable relaxation of the anterior vaginal wall. In each instance, however, the conditions existed prior to operation; 2 of these cases were operated upon a second time, the cervix in each instance was removed, and the fascia of the anterior wall lapped; results in these cases were successful; the third case is awaiting operation. It is true that these clinic cases have been followed less than 3 years and may be considered as proving little. However, in reviewing the histories of my private cases, extending over many years, the results have been similar to those found in the follow-up cases.

If intra-abdominal anchoring of the ligaments to the cervix prevents or corrects prolapse of the cervix, as claimed by its advocates, it would seem logical to conclude that when performing complete hysterectomy, vaginally or abdominally, for the correction of procidentia uteri, the implantation of the ligaments in the vaginal vault would be alone sufficient to correct prolapse of the vaginal walls; if this were so, the problem of cure of procidentia would be simple. It is a fact, however, becoming well recognized, that the problem will never be solved by the utilization of these ligaments as essential factors, but only by a proper readjustment of the tissues of the pelvic diaphragm.

Finally, how should the cervix be treated, if at the time of a supravaginal hysterectomy it is found displaced? If its displacement is not serious, the fascial tissues posterior to the cervix may be anchored to the cervix so as to pull the cervix back in the direction of the coccyx; but if there exists a serious injury to the pelvic fascial diaphragm and the cervix is in marked descent, amputation of the corpus should be done without consideration of the cervix, and at the subsequent time a vaginal operation performed to remove the cervix, narrow and lap the pelvic fascia.

CONCLUSIONS

1. If the action of the round ligaments, when these ligaments are anchored to the cervical stump, effects a change in the position of the cervix, then this change of position must be toward the symphysis and from the coccyx, and as the normal position of the cervix is in the immediate region of the coccyx, any marked change of its position toward the symphysis constitutes a displacement.

2. If, when the round ligaments are anchored to the normally posed cervix, the position of the cervix after operation is found maintained, it is proof that the anchored round ligaments have had no influence upon the position of the cervix, as the direction of this influence, if any, must be toward the symphysis.

3. A normal fascial diaphragm maintains independently the cervix in a normal position. Its action is constant and its resistance greater than that of the round ligaments, so that the influence of the anchored round ligaments upon the cervix must be nil when the fascial pelvic diaphragm is normal.

4. If the posterior area of the fascial diaphragm is stretched by a retroposed corpus or tumor in the cul-de-sac of Douglas so as to advance the cervix toward the symphysis, shortening of the uterosacral or posterior ligaments is a more logical procedure than anchoring of the round ligaments to the cervical stump.

5. If the entire fascial diaphragm has been injured sufficiently to permit of the cervix advancing and descending toward the vulva and an intra-abdominal removal of the corpus is deemed advisable, then the corpus should be removed without reference to the position of the cervix and the prolapse of the cervix with the vaginal vault corrected subsequently by lapping the fascia of the anterior vaginal wall.

6. No adequate proof has yet been offered to show that the influence of the round ligaments, when anchored to the cervix, enters as a factor, in the slightest degree, in maintaining the normal position of the cervix nor in restoring a displaced cervix to normal.

7. Prolapse of the cervix does not and can not occur after supravaginal hysterectomy, if previous to the operation the fascial diaphragm is ininjured and the cervix is in normal position.

TUMORS OF THE BREAST

Based on a Study of Seventy-Seven Cases Personally Observed[1]

By MILES F. PORTER, M.D., F.A.C.S., Fort Wayne, Indiana

THE present study is based upon all of the cases of tumor of the breast that have come under my observation since November, 1905, except a few cases, perhaps 25 or less, that were operated upon either in private homes, or outside hospitals, or under other circumstances which rendered the keeping of anything like adequate reports impossible.

Of the 77 cases reported, 49 were malignant and 28 were benign. The types of malignancy observed with the number of each type were as follows: adenocarcinoma, 7; scirrhus carcinoma, 17; duct cancer, 4; lymphosarcoma, 1; gland-cell carcinoma, 1; squamous carcinoma, 2; medullary carcinoma, 2; metastatic carcinoma, 1; cylindrical cell carcinoma, 2; not classified, 12.

Correctly to classify carcinoma microscopically necessitates, as has been pointed out by Deaver and others, a large number of sections, and had this procedure been carried out in all cases above reported, it is not at all unlikely that the classification might have differed considerably from the one given.

Inasmuch as the predominating type of cancer in this group of cases supports the generally accepted view that the majority of cases of cancer of the breast met with would be classed clinically as belonging to the scirrhus type, I think it may be said that it represents fairly accurately the relative frequency of the occurrence of the different types. It is, of course, well recognized that the results of the microscopic study of tumors do not correspond with those obtained from the clinical study of the same cases. It is important that the two methods of study be combined whenever possible.

No composite tumors were found in this group. In one case, from an examination of a frozen section there came back the report, "sarcoma," and in another the report came back, "non-malignant." Further study in these cases proved them both to be carcinoma of the scirrhus type. Experiences similar to the above are not uncommon and emphasize the necessity of examining numerous sections in a certain percentage of cases before making the diagnosis. I have for long made it a rule to do a radical operation in all cases in which the report on frozen section comes back as malignant, but in cases wherein the clinical examination of the case leads to the conclusion that the trouble is malignant, a radical operation is likewise done, even though the report on the frozen section comes back, "benign."

In 11 of the cases there was, in addition to the tumor present, either depression of the nipple, ulcers of the skin, or fluid discharging from the breast. The fluid discharge was in some cases colorless and in others, bloody. The character of the discharge does not indicate the character of the growth, so far as the question of malignancy is concerned. One may have either a bloody or a clear discharge from the nipple in either benign or malignant trouble. Discharge from the nipple does indicate, however, that the pathologic change is within the duct. In 2 of the cases reported in this series, a discharge from the nipple was the only sign of trouble present. There was no tumor. One of these 2 cases proved to be malignant and the other, non-malignant. The fact that a discharge from the nipple may be the only sign of cancer demands emphasis.

The youngest patient in this group was 17 years of age, female, unmarried. She had a duct cancer. The breast and the fascia underlying it only were removed in 1908. She is married and living at the present writing, but whether or not there are any signs of a return of the trouble, I cannot say inasmuch as I have been unable to get into communication with her. This patient stated that the growth started immediately after an injury received 2 years prior to her visit to me. The case is of particular interest first, because of the age; second, because of the length of time (2 years) that elapsed after the appearance of the tumor before she consulted a surgeon; third, because of apparent permanent cure after simple removal of breast and underlying fascia.

[1] Read before the American Association of Obstetricians and Gynecologists, Cincinnati, Ohio, September 15-19, 1919.

The oldest patient was 71. She had a scirrhus carcinoma. One benign tumor, neurofibroma, occurred in a woman of 60. The youngest patient with a benign tumor was a female, age 22. In 885 cases of tumor of the breast, Bloodgood[1] found only one cancer occurring in a patient under 25. This patient was 21. Thompson[2] removed an adenocarcinoma from the left breast of an 11-year-old girl. Battle and Maburg (*loc. cit.*) report an epithelioma of the nipple of a girl of 11. Brewer (*loc. cit.*), of New York, removed from the breast of a 16-year-old negress an intracanalicular adenopapilloma undergoing malignant transformation. So far as I have been able to learn the above are the only cases reported in as young a patient as mine. Thirty-three of the women had nursed children and of these, 25 had malignant tumor. Of the forty-two women who had tumors of the breast and who had not nursed children, only nineteen had malignant tumors. Fifty-seven of these patients were married. The important point in the history of a woman with tumor of the breast is not whether she is married or unmarried, but whether she has ever been pregnant and especially whether she has nursed children or not. It does seem from my experience, and this experience I think accords with that of other surgeons, that nursing is one of the causes of cancer of the breast, and, on the other hand, that the married state in and of itself may not be said to be in any sense a cause of cancer of the breast. It is because and only because the married state increases the incidence of pregnancy that it may be said to be a contributing factor in the production of cancer of the breast.

Of the women over 15 years of age in my state (Indiana), 65 per cent are either married, widowed, or divorced. In my series of cases, 76 per cent of the malignant tumors of the breast occurred in married women and the same percentage of cases occurred in women who had nursed children, while only 24 per cent occurred in single women and 43 per cent in women who had not nursed children. It will be noticed also that in this series of cases, 9 followed infection and 7, injury of the breast. Taking all the facts into consideration, it seems that we are forced to the conclusion that the changes in the breast incident to pregnancy enhance the likelihood of the occurrence of cancer and that, if there is added to these changes, additional sources of irritation, etc., which come from nursing, the likelihood of the occurrence of cancer will be still further increased. I am forced by the facts to disagree with Deaver when he says:[3] "Married women are proportionately less liable to develop cancer of the breast than unmarried women."

In 49 malignant cases in this report, there were 9 cases in which there was a history of preceding infection of the breast, and seven cases in which there was history of an injury. In this connection, the case of Mrs. H. T. is of particular interest.

She came to me 34 years after having had an abscess of the breast, which abscess was lanced. Immediately following the lancing of the abscess, a lump appeared and remained. I found that she had a scirrhus carcinoma of the breast, involving the axillary glands. A radical operation was done in 1913. Three years later a recurrent nodule was removed. This spring she reports herself in good health, but says she has had an irritating skin disease on her arm ever since the operation. There is no return of the cancer.

Concerning the character of the operations done in these cases, we find that in 9 the tumor only was excised. There was a return of the trouble in one of these patients 6 years later, at which time a radical operation was done. The woman is now (4 years later) well, with no sign of a recurrence. It might be well to add that this recurrence was at the site of the previous operation, which was in the anterior axillary line, and was noted about one and one-half or two years before she came to consult me about it. The reason for doing a simple excision in this case was because of the fact that the woman reported that the trouble commenced with a red spot on the skin, which had followed the grippe and which appeared about a year prior to her visit to me, and because on examination I concluded that the trouble was probably infectious in character. A frozen section was

[1] Binnie. Regional Surgery, vol. i, p. 558.

[2] Deaver and McFarland. Anomalies and Diseases of the Breast, p. 514.

[3] Anomalies and Diseases of the Breast, p. 524.

not made; but, as the laboratory report received later showed "early scirrhus carcinoma," I thought it just as well to postpone radical operation until there was some sign of the return of the trouble, for which I told the patient to keep a careful watch. What should have been done with this patient, in my judgment, at the primary operation was a total removal of the breast and axillary glands. I shall refer to the question of the extent and character of the operation later on.

In 42 cases a primary radical operation was done. In 14 cases a radical operation was done, following an excision of the tumor and an examination of a frozen section. In 12 cases the gland only was excised. In only a little more than 50 per cent of the malignant cases was an immediate radical operation regarded as necessary.

The shortest time that elapsed after the trouble was first noticed until a doctor was consulted was 4 days. This proved to be a fibrous tumor, which was removed 9 years ago, and the woman is now in perfect health. The longest time intervening between the first symptoms and the visit to the surgeon was 34 years. This was the case of Mrs. H. T. reported above.

In this series there were 2 cases occurring in males. In both the tumors were benign. This corresponds very closely with Schuchardt's finding, which was that about 2 per cent of all neoplasms of the breast were found in men. The combined tables of Primrose, Judd, and Deaver, as compiled by the latter, show that .88 per cent of the cancers of the breast occur in males.

Only 4 of the cases reported in this series had coexisting maladies. One of these had a fibroid tumor which was removed some months after the radical operation for carcinoma of the breast. In another patient, a round ligament operation for retroflexion was done at the same time the breast was operated upon. In still another case, a hæmorrhoidectomy was done. Both the latter patients had benign tumors. In one patient the breast was removed for what proved to be benign tumor, 2 years after hysterectomy for carcinoma. The tumor in this case appeared 6 months before the hysterectomy was done.

Of 22 cases of cancer from which we have late reports, 13 had involvement of the axillary glands at the time of the operation. Of these 4 are living and well after 5 years or more — 30 per cent; 3, after 3 years or more— 23 per cent; 4, less than 3 years. One had a recurrence and 1 is dead. There are 7 cases in which no gland involvement was found. Of these 2 are living and well after 5 years or more; and the remaining 5 are living and well but are within the 3-year period. One of these cases, reported as well in the 3-year period, is that of Mrs. H. T. above reported, who had a secondary operation for a recurrent nodule, in the spring of 1916. Of the patients who are dead, two had both metastatic and local return of the trouble. Six had no local return but metastasis only: 1 to the liver, 1 to the stomach and bowels, 1 to the lungs, 2 to the brain, and 1 died of metastasis involving the upper end of the femur, the upper part of the cord, and the brain (3 in 8 went to the brain).

The diagnosis in all these cases, save 2, was confirmed by laboratory examination.

In the 16 benign cases of which we have late reports, there has been no return of the trouble except in Mrs. L. who reports that she has had a lump in the arm pit for 6 months. The laboratory report on this specimen was benign adenoma. The tumor only was removed. I have not been able to see the woman and cannot say whether this means that there was a mistake in the diagnosis at the time or just what the correct explanation of the lump in the axilla is.

There was no operation mortality. In this series we have had in all 6 cases that have passed the 5-year period. This gives us 27.2 per cent of 5-year cures, and 13.6 per cent of 3-year cures. It will be remembered that we had thirty per cent of 5-year cures in the 13 cases that had axillary involvement at the time of operation, 2.8 per cent more 5-year cures than is shown in the whole series including those who had no axillary involvement. This, I take it, is only one of those vagaries with which one sometimes meets in the study of statistics, and in no wise contradicts the fact that axillary involvement adds to the gravity of the prognosis. How-

ever, it does emphasize the fact that not all nodes in the axilla of a patient with breast cancer are cancerous. It should be said in this connection that all of the patients were benefited by the operation, including even those who later died of the trouble. In my opinion the benefit derived from the operation on these late cases was in a material measure mental; that is to say, the knowledge that the growth was removed gave them mental relief for a time, though later there was a return.

"It has been well established," says Benedict[1] "that heredity plays no notable part in cancer." I cannot subscribe to this opinion. While I have not gone over all my cancer cases with a view to a study of this question of heredity, I have a very strong impression from my experience with cancer in general that we are at present underestimating the importance of the part which heredity plays in the production of cancer. The following is one of the most impressive cases that have come under my observation:

Miss M. T. R., age 43, single, physician, was operated upon by me, in 1913, for cancer of the uterus. Her family history is as follows: Mother died of cancer of the rectum. Two brothers died of cancer, one of the cæcum and one of the rectum. One maternal aunt died of cancer of the uterus; one maternal uncle died of cancer of the rectum; one maternal great-aunt died of abdominal cancer; one maternal great-uncle died of cancer of the colon; one maternal second cousin died of cancer of the stomach and another of cancer of the bowel; another maternal second cousin was recently operated upon for a cancer of the uterus.

The experiments made at Harvard with mice seem to show that in those animals one can breed either immunity or susceptibility. Moreover, it is illogical to assume that heredity plays an insignificant part in the production of cancer in man in the light of the well-established facts concerning the breeding of form, color, and character in the lower animals.

In a paper read before this body seven years ago[2] I said: "All demonstrable cancers require radical removal." My opinion in this regard has been changed. I do not think it advisable to remove the breast muscles and axillary glands in very early cancers wherein the pathology seems distinctly circumscribed. In cases of this kind I have for several years contented myself with removal of the whole mammary gland. These cases are probably those that MacCarty puts in the class of secondary cytoplasia. He says:[3] "At the time of preliminary investigation I had confidence in the old criterion for histological malignancy which utilizes the basement membrane (*membrana propria*) as the line of demarcation between a malignant and a benign condition; the cells of secondary cytoplasia are within the histological bounds of benignancy despite the fact that they are morphologically identical with those of carcinoma. From a clinical or practical standpoint, I have been convinced that all mammary gland-bearing tissue presenting such a picture should be removed, leaving, perhaps, the pectoral muscles and axillary lymphatic glands. I have not felt justified in advising the removal of the breast, muscles, and axillary glands by means of a radical operation. Rules have been established on this basis and subsequent postoperative histories have justified, so far, the legitimacy of such a conservative operation."

Regarding the particular type of operation done, whether radical operation or simple excision, it is better to choose the operation to fit the case than to make the case fit the operation.

In closing let me say that our only hope of improving the results in the treatment of cancer lies in earlier operation. In the Baltimore clinic, according to Bloodgood[4] the proportion of benign to malignant tumors of the breast has increased 27 per cent in the last 27 years. Bloodgood accounts for this fact on the ground that the public and the profession are better educated as to the importance of early removal of tumors. It is quite generally conceded, I think, that surgeons see these cases much earlier on the average now than in former years. That this is true is due in no small measure to the efforts of the American Society for Control of Cancer. This society should receive the hearty cooperation of the whole medical profession.

[1] Am. J. M. Sc., 1919, clvii, 749.
[2] Tr. Am. Ass. Obst. & Gynec., 1912, xxv, 222.
[3] Am. J. M. Sc., 1919, clvii, 663.
[4] Binnie. Treatise on Regional Surgery, p. 562.

TWO UNUSUAL NERVE LESIONS

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MILITARY Surgery has directed our attention to lesions of the peripheral nerves in a way that the longest experience of civil practice could never have done, and has emphasized in a special degree the importance of exact anatomical relationships. If the surgeon is to be more than a competent handicraftsman, his knowledge of the paths pursued by the peripheral nerves, as well as the muscles supplied by them, and the sensory areas with which they are linked, must be precise.

To illustrate, 2 cases which have lately come to my knowledge may be quoted. The one occurred in military, the other in civil work.

L/C. H. M.M.H. Sustained gunshot wounds in various localities. The more important of these were dealt with *secundum artem*. One, comparatively trivial, was in the right cheek. Here a piece of shell had entered and was removed by the stretcher bearer who brought him in. The wound suppurated for a few days. No facial paralysis or even paresis resulted, and the wound, being satisfactorily healed, was ignored. The other day, in the course of routine inspection, he complained of twitching of the muscles of the right side of the face, with a tendency to lacrimation in the right eye when exposed to cold, to wind, or to bright sunshine. In addition to this, the skin on the right side of the face under the right lower eyelid, and at the root of the nose, was somewhat sensitive. He complained of a tickling sensation, this being pronounced even with a slight touch. By pressing his tongue against the buccal aspect of the upper lip and the right upper cheek he produced a tickling sensation in the face.

Examination revealed full voluntary movement of all the muscles of the face. Twitching was observed, mainly in a line extending from the malar bone toward the right angle of the mouth, the line being that of the zygomaticus muscle. A small nodule of scar tissue was present in the cheek just below the inferior margin of the orbit. X-rays of the skull ruled out of account the question of foreign body being present. The explanation of his disability is, I think, the following:

The fragment of metal was a somewhat large one and left a hole of some size which filled in partly by scar tissue. This scar tissue involved branches of two sensory nerves: (1) the twigs from the infra-orbital branch of the maxillary division of the trigeminal, (2) the buccinator branch of the mandibular division of the same cranial nerve.

The irritation of this scar has produced heightened sensibility of other sensory branches supplying the conjunctiva, and this reflexly has induced increased secretion of the right lacrimal gland along with motor irritability of the facial muscles which are closely associated with the trigeminal sensory distribution.

The fibers of the zygomaticus muscle were divided through a small incision. This muscle is very superficial, and the result was practically no interference with facial expression. The principle involved in this measure is precisely the same as that in virtue of which one divides muscles in cases of spasmodic torticollis.

In order to meet the heightened conjunctival irritability, it was not thought advisable to excise the scar involving the infra-orbital branches, on account of interference with sensation of the right side of the face. Accordingly, a trial was made of the use of tinted glasses, the lenses being of large size in order to minimize the influence of sunshine and wind. Up to the present the result has been quite satisfactory.

The second case, H. R., age 38, came to me in September, 1919, complaining of weakness of the left hand. This weakness had been present for 6 or 7 months and was gradually increasing. He had had no accident, and no injury to the back, left shoulder region, or left upper limb. His occupation was that of a butcher. Investigation of the detail of his work gave a clue to the cause of the weakness.

Examination of the left hand showed no atrophy of the thenar or hypothenar eminence, and no loss of sensibility in any area. A tender spot was present about the center of the left palm, just distal to the proximal transverse crease.

An X-ray was taken. This showed no abnormal shadow. The electrical reactions of the muscles of the hand were also taken. These showed a normal response both to faradism and galvanism in all the small muscles of the hand. There was, however, distinct atrophy of all the interossei, and when full extension of the hand was attempted, some hyperextension was noted at the metacarpophalangeal joints, along with less complete extension than normal of the two distal phalanges, this condition being more distinct in the little and ring fingers.

Fig. 1. Case 1. Showing scar on cheek.

The appearance of the hand was that of the typical ulnar nerve lesion, though not in pronounced degree.

Though his occupation was given as that of a butcher, one discovered that he was in the employment of a large meat-packing house, and that his work consisted in skinning animals. In this work the hide was grasped firmly with the left hand, while cutting strokes were made with the right. This work involved the skinning of over one hundred animals per day. The weakness of the hand was observed about one month after he had commenced this work. What had happened here was that the deep branch of the ulnar nerve, traversing the palm of the hand from ulnar side to radial just proximal to the heads of the metacarpals, was the seat of a traumatic neuritis, the result of direct pressure. Recommendation was made that this form of work cease immediately and that as soon as the local tenderness had subsided, massage of the hand with mild faradism of the affected muscles be instituted. After a few weeks of this treatment, acting on instructions from headquarters in Chicago, it was stopped.

The patient was seen lately—on February 17, 1920. The atrophy was still present to some extent, and the weakness of the hand was still there in small degree, although the measure of recovery was considerable. Had treatment been persisted in, one has little hesitation in saying that by now the hand would have been practically well.

Thinking that this case was not likely to be unique, I communicated with the meat-packing concern, asking if similar cases had occurred. Their reply is subjoined:

Fig. 2. Case 2. Showing location of tender spot.

Fig. 3. Case 2.

Replying to your inquiry of the 19th inst., in reference to Mr. H. R., who was suffering from a condition of the left hand. This is the only case of its kind we have ever had to deal with, and the nature of the case is such that it leads us to believe that it was not the result of work he was doing, and the trouble no doubt dates back of the time when he was employed by us.

There have been a good many men performing the same work that Mr. R did, none of whom suffered from the same condition, making this case an interesting one to us, as it is the first case of its kind which has come to our attention.

It will be seen that the writer of the letter does not support my diagnosis, but no alternative is offered, and I do not see that an alternative is possible.

The chief interest of these two cases lies in the fact that they introduce an element of exact anatomical knowledge, which is too often lacking in the surgeon's equipment a defect which, even in these times, is sometimes proclaimed as a virtue.

BLASTOMYCOSIS

With Report of a Case Dying from Abscess of the Brain[1]

By JOHN T. MOORE, A.M., M.D., F.A.C.S., Houston, Texas
Surgeon, St. Joseph's Infirmary

KNOWLEDGE concerning blastomycosis does not seem to be as complete as its importance would suggest. A large percentage of the surgeons with whom I have talked regarding the subject have not seen a case. Although the literature on blastomycosis has grown to be rather extensive, Warbasse's recent *System of Surgery* dismisses the subject with less than eight lines. Bevan, of Chicago, who has seen a number of cases suffering from the disease, devotes a number of pages to its discussion in Lever and Bevan's *Textbook of Surgery*. Their article is a most excellent one, the best I have seen in a surgical textbook. The textbooks on diseases of the skin give good descriptions of the cutaneous lesions, but little is said of the more important phases of the disease, i. e., the systemic involvement of the various organs of the body. Practically any or all the organs may become involved.

Many instances of failure to make a diagnosis are found in practice. This is probably due to our failure to keep in mind that this disease is not so uncommon and that it can and does involve tissues and organs other than the skin and often produces lesions similar to tuberculosis, syphilis, and other systemic diseases. The disease is an important one from both a medical and surgical point of view, as it frequently begins with very severe constitutional symptoms before any showing of a local condition appears, while in other cases the disease at first local in the skin becomes systemic and usually fatal.

It is generally accepted now that the organism first described by T. C. Gilchrist (1), of Johns Hopkins Hospital, is the pathogenic agent in both the local skin lesions as well as in the various systemic forms of the disease. Gilchrist, it seems, presented his report of a case in 1894 to the American Dermatological Society, and later published a most complete study of the organism in *Johns Hopkins Hospital Reports*, in 1896. The disease at that time was regarded as entirely a local one; hence the name blastomycetic dermatitis.

There are now in the literature quite a number of systemic cases, the first one being reported by Busse and Buschke (2). The name has consequently been changed from that of blastomycetic dermatitis to blastomycosis of whatever organ it may involve, systemic and local.

Many writers speak of it as the "Chicago disease" on account of the large number of cases reported from there. I am inclined to think, however, that as a knowledge of this disease grows it will become more widespread in its distribution. In fact this has already happened for cases are being reported from all parts of this country and also from the foreign countries.

There is no need for me to go into a description of the organism, as there is available a number of well written articles by authors who can do the subject far better justice than I. No one seems to have presented much of importance about the organism since Gilchrist's classical paper in 1896.

The source of infection is still an unsolved problem. Evans (3) has reported a case of infection through a punctured wound.

Montgomery (4), in an analysis of 44 systemic cases, shows that 42 of these had an involvement of the lung. The frequency of lung infection has led to the idea that the lung is a common avenue of entrance. Others have suggested the intestinal tract as the avenue. The tongue (5) has been shown to be the primary seat of the trouble. A general lymphatic distribution of the organism has been shown by LeCount (6).

I have read of one case that seems to have received the infection through an injury by scratching the leg against a barbed wire fence.

A case reported in a personal communication by M. B. Stokes, Houston, followed a

[1]Read at the meeting of the Southern Surgical Association, New Orleans, December 16, 17, 18, 1919.

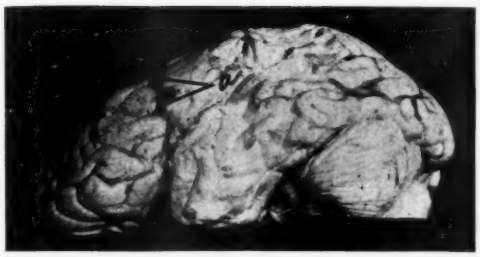

Fig. 1. Photograph of brain showing opening of abcesses at *a*.

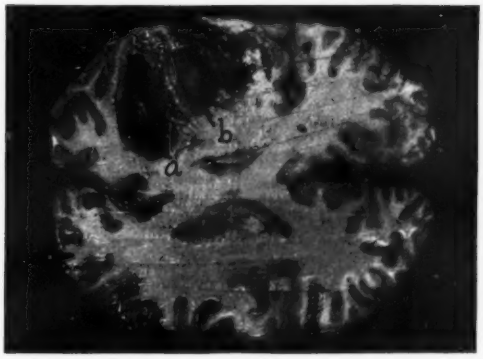

Fig. 2. Section through brain showing two large abscesses, *a* and *b*.

burn on the hands and wrists. Eighteen days afterward a peculiar papillomatous eruption appeared and upon examination blastomycetes were found; hence this case seems to have been infected in some way following the burn.

Our case became infected through the mouth, apparently. The trouble began in a lower wisdom tooth. It is interesting to note that the patient had the habit of keeping a splinter of some kind in his mouth. The history is as follows:

CASE 1. No. 2364. G. W., age 17, school boy, born in Texas, referred to me by John H. Foster, November 26, 1918, for what was diagnosed as necrosis of bone in the left temporal region. The patient was a well developed, muscular young man, weighing 156 pounds, and 5 feet 9 inches tall. His color was good, and he did not look very sick.

Family history. The mother and three brothers are living and in good health. The father died of paralysis at the age of 40, when the patient was a boy of 9. The following history of the father was obtained:

Grant W., age 40, carpenter and farmer, born in Illinois, height 5 feet 8 inches, weight 160 pounds. Moderate habits. He was healthy up to the time of last illness with the exception of one spell of malarial fever 10 years previous to last illness. He was taken down with chills and fevers—pains in back and lower limbs. He was treated for malaria 2 weeks. He went to Hot Springs, Arkansas, but hot baths made him feel worse. One week after he began taking baths, the right leg from hip to foot became paralyzed, the paralysis coming on suddenly; the next day the left limb was affected, and he suffered from complete paralysis from the waist down. Prior to the paralysis he had had considerable pain in the back with occasional spells of nausea and vomiting, chills and fever every day, sometimes several chills a day. The fever would go very high. There was no pain or nausea after paralysis set in. The man died *one week* after the first attack of paralysis, May, 1919. He had lost considerable weight during his illness.

Personal history. The patient is an active vigorous boy, taking part in all the athletics of his school, which was at Weatherford, Texas. He does not use tobacco or alcoholic liquors of any kind. He says that he has a habit of holding a splinter or stick of some kind in his mouth. He is neat and clean in his habits. He studies hard and stands well with his classmates.

Previous diseases. He had measles and whooping cough when a child. He had pneumonia at the age of 7. He was well and vigorous up to the time of present trouble.

Present disease. On August 9, 1918, the trouble began in the left lower jaw in the region of the wisdom tooth. He thought he had toothache and consulted a dentist, who told him that as soon as the tooth got through the gums he would be all right. The pain gradually extended to the entire left side of the face. The dentist claimed that there was inflammation about the wisdom tooth and advised hot applications to the side of the face. The jaws began to get stiff and he could only partly open the mouth.

The latter part of September, the dentist forcibly opened his mouth and extracted the left lower wisdom tooth, which tooth was found not diseased. The pain and swelling in the face and side of the head continued. The area above the left ear became more swollen than the other parts of the face. This swelling was lanced by a doctor on October 1, but he got only bloody serum, no pus. The pain grew more severe and the doctor advised his return to Houston where he arrived about November 15, 1918.

As the patient continued to grow worse he consulted J. H. Foster, a specialist on the ear, nose and throat.

Dr. Foster had a Wassermann made, but the reaction was negative. The X-ray and other studies

showed no mastoid involvement, nor any involvement of eye, ear, nose, or throat.

On November 26, 1918, Dr. Foster asked me to take charge of the case. At this time there appeared to be three distinct abscesses or gummata, one just above and behind the left ear, another just in front and a little above the ear, while the third swelling was about midway between the ear and the outer canthus of the left eye and a little above the zygoma. The skin over these swellings had rather a reddish blue appearance, and the areas fluctuated upon pressure, but were rather firm to the touch. The areas were quite suggestive of actinomycosis or blastomycosis, both in appearance and to the touch.

The pus showed upon examination the organism of blastomycosis. It was decided to open, curette, and drain the swellings. This was done very thoroughly under ether anæsthesia, December 7, 1918. The material was somewhat thick and cheesy; very readily came away with a sharp curette. Underneath the pus and cheesy contents of the abscesses was some necrotic and granular material, which being curetted away left a bleeding surface. After curetting these wounds they were swabbed with strong tincture of iodine and packed with iodoform gauze for 24 hours. Upon removing the packing Dakin's tubes were introduced and Carrel-Dakin's solution used, for 3 or 4 days. After the wounds appeared clean, alcohol dressings were applied. The patient was put upon potassium iodide as first advised by Bevan, and the dose increased up to about 240 grains per day.

On December 14, 1918, the abscesses did not appear to be clearing up so well so these cavities were again curetted thoroughly. After a few days he was given the X-ray treatment by B. T. Vanzant and in the course of 60 days, the wounds appeared to be practically healed.

It was observed that at about the center of each healed abscess there appeared a small elevated and soft area. These were kept opened up and syringed out daily with sulphate of copper solution 1 per cent. The copper solution seemed to have a very destructive action on the organisms, and under this treatment the small abscesses would heal. We tried silver, lysol, and bichloride solution, but the copper was by far the best of them.

The patient was kept in the hospital from December 6, 1918, to January 16, 1919. He was carefully fed and in every way thoroughly treated. When he left the hospital we felt pretty sure that he was safely on the road to recovery.

The X-ray treatments had darkened the skin as from sunburn, and the tissues seemed thoroughly healed, although there was evidence of considerable fibrous tissue at the sites of the healed abscesses. The fibrosis seemed a favorable condition to prevent further spread.

He continued to do very well until about June, 1919, when there appeared evidence of involvement of the tissues in the orbit just above the left eye. A good oculist was consulted, and the abscesses opened and syringed out with sulphate of copper solution 1 per cent.

The eyeball gradually began to bulge forward notwithstanding the drainage of the lesions in the upper lids seemed free. From time to time the removal of the eye was discussed but nothing was done until September 9, 1919, when the eye was enucleated, with the following comments of the oculist, Dr. Wallace Ralston:

"On or about August 1, 1919, the left eye showed signs of being pushed forward—exophthalmos. There were noted two discharging sinuses of the upper lid; one about the middle of the lid under the orbital eminence and the other just outside the outer canthus. These openings led to a point about 1 inch in depth where they came together. This protrusion of the eyeball gradually became more pronounced until the lids could not cover the eyeball. The conjunctiva of this eye became very chemotic, irritated, and angry in appearance. The cornea became hazy. Before the cornea became too hazy, with the ophthalmoscope it could be seen that the optic nerve was quite pale; optic atrophy. The retina showed slight changes, the vessels being somewhat narrowed and the entire background appeared slightly paler than the right. Motion in the eye was very much restricted, being almost fixed in the orbit, or almost out of the orbit proper.

"It became clearly evident that it was necessary to do something more radical, as the eye could not be saved, so on September 9, 1919, the eye was enucleated. A large mass, the size of an eye, about 1 inch in diameter, very hard, was found deep in the orbit on the temporal side. Feeling that this must be a very tense abscess or cyst, scissors were used in opening it. A large quantity of pus was evacuated. The tumor, of course, collapsed."

The patient was allowed to leave the hospital 3 days after the enucleation of the eye. He was feeling very well though he had become somewhat emaciated. On the 16th a small abscess about the left frontal eminence was opened and much pus of a foul nature evacuated.

On September 17, 1919, he was sent back to the hospital on account of a convulsive seizure. When seen in the hospital he presented nothing very different from a patient who had had an attack of epilepsy. We suspected cerebral involvement, feeling that the pus drained away came through the skull. The reflexes were normal and no evidence of involvement of cranial nerves appeared. The convulsions which were partially Jacksonian in type continued, four on the 18th, two on the 23rd, and twelve on the 24th. Paralysis of the right arm and leg and partial paralysis of the face developed on September 21. Death occurred on October 12, 1919.

LABORATORY REPORT AND POSTMORTEM REPORT BY DR. M. A. WOOD, CASE G. W.

Blood. The Wassermann test was negative on November 26, 1918 (Dr. E. F. Cooke), and again on December 9, 1918 (Dr. M. A. Wood).

Blood cultures were made on December 9, 1918, and were sterile after 2 weeks.

A blood count made September 24, 1919, showed white blood cells, 40,000, polymorphonuclears, 94 per cent, small mononuclears, 6 per cent, large mononuclears, 0; eosinophiles, 0; basophiles, 0.

Urinary examination made at various times showed no abnormality. December 6, 1918, examination of pus from the lesions on the side of face showed blastomycetes of varying sizes, large and small, with some budding forms. Examinations made April 11, 23, and May 27, 1919, of the pus from these lesions always showed similar variations in size and character of the organisms.

The eye. In the abscess in the orbit posterior to the eye, after the eye was removed, were found many large sized blastomycetes. These large blastomycetes were contrasted particularly with the small size of those found in the pus from the abscesses of the brain. No other organisms were found in the pus from the deep orbital abscess, or from the brain abscesses.

The brain and membranes. Sections from the dura mater through one of the thickened portions show, on the meningeal surface, an extensive round-cell infiltration with proliferation of the endothelial cells and connective-tissue cells and formation of giant cells. No blastomycetic organisms were seen. The proliferation of connective-tissue cells extends throughout the entire layer of the dura.

Sections of brain tissue on the edge of the abscesses show, first, a zone of necrotic material, next a zone in which polynuclears, eosinophiles, and connective-tissue cells predominate. Beyond this zone, small round cells and connective-tissue cells are more prominent. No giant cells are seen. Some small blastomycetic organisms are seen in these sections.

Postmortem, October 12, 1919, on head of case of blastomycosis. External appearance: The skin on the side of the face was of a dark red color, rather contracted at various sites of old healed openings. The skin is smooth between the healed lesions. There was noted one opening through skull about 1 inch back of the left frontal eminence. There is another opening near the lower end of the left coronal suture; also an opening through the left orbit at the left and above the outer canthus. Practically all of the upper part of the left temporal muscle has been destroyed.

The anterior one-third of the left side of the skull presented a worm-eaten appearance on the under surface with three openings as mentioned. An exostosis of the skull was seen on the outside near the left orbit. The dura is thickened in patches over the anterior half on the left side and also along the falx cerebri. The outer surface of the left cerebral hemisphere exudes pus from two openings into deeper tissues. An exudate was seen covering the anterior half of the temporal lobe, the central portion of the parietal lobe, some small patches over frontal lobe, and areas along intercerebral fissure.

The vessels of both hemispheres were full of blood.

Sections through the brain show an abscess cavity 3.4 centimeters by 2.5 centimeters in the center of the frontal lobe, and extending to within 2.5 centimeters of the under surface of the frontal lobe, and communicating with the upper surface through an opening in the mediofrontal gyrus about 1 centimeter from the fissure of Rolando or central fissure.

A second abscess cavity is shown separated from the first by a narrow zone of brain tissue 0.3 centimeter wide. This abscess measures 2.8 centimeters by 2.1 centimeters, is oval-shaped and extends downward for about the same distance as the first abscess, its upper margin being about 1.2 centimeters below the surface of the brain. The whole cavity lies under the central portion of the fissure of Rolando. No external communication had been made by this abscess.

Behind and to the outer side of the second abscess cavity was a third abscess separated by a narrow zone of brain tissue 0.2 centimeter wide, irregular in shape, about 3.7 centimeters long, and ½ centimeter at its widest part, and with a communication of the surface just posterior to the fissure of Rolando, and about 2 centimeters above the junction of the rolandic and sylvian fissures. This abscess extended to about the same distance from the under surface as the others. Cross sections caught all three abscesses at about the same level on their under surfaces.

A further abscess cavity is seen on the mesial aspect occupying the central portion of the superfrontal gyre, only a thin wall of brain tissue separating it from the exterior. This cavity measures 1.8 centimeters by 1.7 centimeters by 1.8 centimeters.

The frontal lobe on the affected side bulges toward the right side and shows a difference of 1 centimeter in the diameter of the two frontal lobes.

CONCLUSION

1. The infection in this case was probably introduced through the mouth from the splinters habitually carried in the mouth.

2. The treatment of the case was hardly radical enough in destroying the various recurring foci of the disease.

3. The eye should have been sacrificed earlier, and radium used in the orbit as the X-ray was apparently the best agent used in the treating of the lesions on the face and neck.

4. The disease remained more or less local for a long time notwithstanding its tendency to spread through the lymphatics and become systemic. No organisms were obtained either

from the urine or sputum, nor did we succeed in getting a culture from the blood.

5. The infection of the brain was possibly through the ophthalmic vein or through the veins of the scalp and emissary vein through the skull.

6. The study of the organisms in the different lesions and tissues showed a considerable variation in their size; those from the abscesses of the face, neck, and orbit, showing the large forms, while no large forms could be found either in the pus or the tissue from the brain.

7. There are many budding forms of the organisms, but no evidence of endosporulation, as in coccidiodes.

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SUBPHRENIC ABSCESS

Report of a Case with Cure[1]

By ALFRED ULLMAN, M.D., F.A.C.S., and CHARLES S. LEVY, A.B., M.D., Baltimore
Visiting Surgeon, Hebrew Hospital

If we accept the definition of Barnard (1), that "any localized collection of pus which is in contact with the under surface of the diaphragm is a subphrenic abscess," the definition must also include localized hepatic abscesses which may have extended up to the diaphragm. In a series of 890 cases collected by Piquand (2) in 1908, 28 per cent followed gastric and duodenal ulcers and 21 per cent appendicitis; 15 per cent were associated with the liver and biliary passages, six per cent with intestinal diseases; and the remaining 3 per cent with various conditions. Of Barnard's series of 76 cases collected from the London Hospital, gastric and duodenal ulcers were responsible for one-third of the cases (34 per cent), appendicitis for one-sixth (15 per cent), tropical and hydatid diseases of the liver for one-sixth (17 per cent); the remaining were distributed among rare conditions, such as cancer of the pancreas, pyosalpinx, splenic infarct, gall-stones, etc.

From a review of the literature since 1908, appendicitis as the cause of subphrenic abscess appears to assume the principal etiological rôle. This view was vigorously suggested by Heffinger (3) in 1912.

Subphrenic abscesses are apparently not so common today as formerly. The improvement in diagnostic skill, and the almost universal employment of the roentgen-ray for thoracic and abdominal diagnosis, together with the realization of what clinical diseases may be complicated by a subphrenic abscess, have apparently rendered this condition an uncommon occurrence today. Nevertheless, as the development of this condition is regarded by some as the result of carelessness, this fact may explain to a certain extent the infrequency of reports on the subject during the past 10 years. In the present paper we desire to report the case of a patient who developed a subphrenic abscess while under our care, showing that such a condition may occur even under hospital supervision; secondly, the case is worthy of record in view of the interesting roentgenological findings of an abscess with gas formation. Moore (4) has pointed out that roentgenological illustrations of subphrenic abscesses containing gas are very rare. He found but one illustration and that in Case's *Stereorentgenography of the Alimentary Tract.* He, himself, gives the roentgenological findings in a case of pyo-

[1] From the Surgical Service of the Hebrew Hospital, Baltimore.

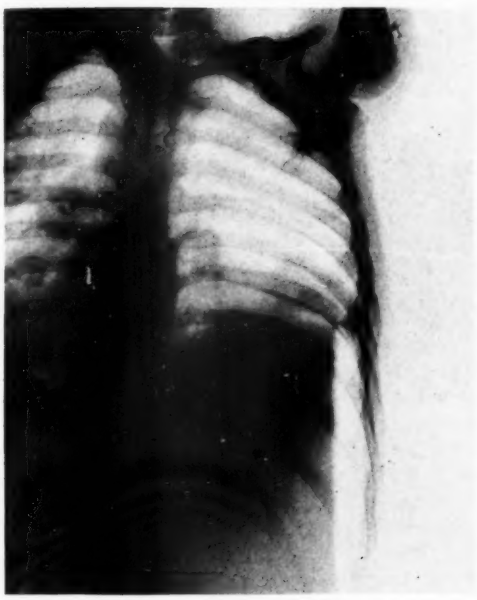

Fig. 1. Shows fluid level below the diaphragm with gas formation above. High position of diaphragm.

Fig. 2. Shows air pocket persisting. Drainage tube in place. High position of diaphragm.

pneumothorax subphrenicus dexter, and adds several excellent illustrations.

CASE 1. September 11, 1919. Admitted to the Hebrew Hospital. L. P., age 13 years. The family and personal history were unimportant.

Present Illness. Ten days before admission, the patient had been taken acutely ill with generalized abdominal pain which, after 2 days, had become localized in the right lower quadrant. He had vomited several times. On admission we found a bulging mass in the mid-line, extending from the umbilicus to the symphysis pubis. Rigidity and tenderness were present over the lower abdomen. Over this mass the percussion note was flat. Catheterization of the bladder had no effect on the size of the tumor. The white blood count was 22,300 with 90 per cent polymorphonuclear neutrophiles. The catheterized specimen of urine showed a trace of albumin and an occasional leucocyte. The temperature on admission was 101°F.

Operation. Having made a mid-line incision extending from the umbilicus to the symphysis pubis, we found in the pelvis an appendiceal abscess which was walled off and from which about 3 quarts of pus were evacuated. The appendix was amputated but the stump was not inverted. Two cigarette drains were placed down to the stump and two down into the pelvis. Tier closure was made with catgut. In spite of free drainage, the temperature continued elevated, varying from normal to 103° F. One drain was removed on September 19 and another on October 2, being replaced by a gauze tip. On October 3, 1919, there was a leucocytosis of 9,000 with 70 per cent polymorphonuclears (3 weeks after the operation). On October 5, the temperature rose from 101° to 104° F., the patient became toxic, and the respirations were 40 to the minute associated with a pulse of 140 to the minute. At this time the patient developed a slight cough with expectoration of a moderate amount of pus having a colon odor. Examination showed the right thorax bulging, with tympany over the liver area. Posteriorly, the percussion note was flat toward the base and on auscultation the breath sounds were almost suppressed over this area, with a suggestion of egophony above the area of impairment. The heart was not displaced. There was now a leucocytosis of 12,500. By exploratory puncture, pus was obtained in the sixth and ninth interspaces in the scapular line. This pus had the same colon odor as the expectoration. A roentgenogram (7058) of the chest showed marked hilus thickening with extension into the middle of the left lung. There seemed to be some rotary displacement of the heart and of the large vessels toward the left. In the anteroposterior position, the diaphragm reached to the seventh interspace on the right and beneath it an accumula-

tion of gas was present. The lateral position showed a distinct fluid level below the diaphragm with gas above, extending from the eighth rib to a point on a level with the outer end of the twelfth rib. There was a pronounced area of inflammatory reaction at the base of the right lung. The liver was not displaced downward. (Fig. 1.)

The clinical evidence and roentgenological findings warranted the diagnosis of a right subphrenic abscess, a left-sided central pneumonia, and rupture of the abscess into a bronchus.

On October 6, 1919, the twelfth rib was resected posteriorly and the diaphragm punctured without opening into the pleural cavity. About a gallon of foul-smelling pus was obtained. Drainage consisted of two iodoform drains and two rubber tubes. A culture of the pus obtained subsequently showed bacillus coli.

Improvement was rapid. The fetid expectoration disappeared immediately. The temperature and pulse began to approach a normal level. Two weeks after the operation, the pulse and temperature were normal.

A roentgenogram (7115, October 23, 1919) showed the drainage tube in place (Fig. 2), and the diaphragm reaching to the lower border of the seventh rib. The general distribution of the gas was confined to a lateral pocket between the chest wall and the surface of the liver. The pulmonary infiltration had decreased appreciably.

The pulse and temperature were within normal limits for the next 3 weeks. When the patient left the hospital, on November 16, 1919, the abdominal and the thoracic wounds had closed. On discharge the patient had lost his former cachetic appearance and gained 12 pounds.

A roentgenogram (7400) on January 13, 1920, three months after the last operation, showed the diaphragm at the normal level at the tenth rib. The air-pocket had entirely disappeared and the liver occupied the normal position. The plate showed a three-quarter inch resection of the twelfth rib.

Today (February 1, 1920) the patient is in excellent health and has returned to school.

The three series of roentgenograms were very instructive. In Figure 1, the diaphragm is at the level of the seventh rib, below which gases are seen in the dorsal position with a marked fluid level, with the patient lying on his side. At the base of the right lung, an area of inflammatory reaction is seen, a condition said by some to be associated constantly with subphrenic abscess. The patient was too ill to be fluoroscoped. Three months later, the air-pocket had disappeared, the diaphragm had resumed its normal position and the lung had apparently cleared up.

It is well to call attention to the advisability of taking lateral plates with the affected side up in patients too ill to stand, with plate behind and tube in front, just as is done in determining fluid levels in pulmonary abscesses.

HISTORY OF SUBPHRENIC ABSCESS

The history of subphrenic abscess supplies an interesting phase in medical literature. It has been divided into three periods: In the *first period* up to 1845, the cases were diagnosed only at necropsy. The descriptions of Ferrus (5, 1824), Louis (6, 1826), Cruveilhier (7, 1832), belong to this period. In the *second period* we find clinical observations. It was Barlow (8), in 1845, who was the first to make the diagnosis clinically and it was he who pointed out the differences between pleurisy and subphrenic abscess. To Eisenlohr (9, 1879), after Barlow, belongs the credit of making the diagnosis. In the *third period* we come to the era of surgical intervention. It begins with Debove and Rémond's (10) *Mémoires*, which appeared in 1890 and in which the authors describe a case which had been previously correctly diagnosed and which was treated by incision and drainage. Maydl's (11) work also belongs to the early surgical period.

ANATOMY

Four intraperitoneal and two extraperitoneal spaces are recognized:

- Intrapertioneal
  - Right < Anterior / Posterior
  - Left < Anterior / Posterior
- Extraperitoneal
  - Right
  - Left

The falciform ligament divides the subphrenic space into two parts, a right and a left. Each of these is subdivided into a larger anterior and a smaller posterior part by the corresponding lateral ligament, thus constituting the four intraperitoneal subphrenic spaces. The right extraperitoneal space lies between the layers of the coronary ligament, and the left extraperitoneal space around the upper end of the left kidney in the perinephritic spaces. Pus may collect in any of these spaces and produce abscesses with signs, according to some observers, which will indicate clearly the space involved.

1. The right anterior intraperitoneal space lies between the upper surface of the right

lobe of the liver and the diaphragm, with the falciform ligament to the left and the coronary ligament posteriorly. In this variety of abscess, the liver becomes adherent to the diaphragm in front. Pus is localized at the upper and the posterior part of the recess; the diaphragm is pushed up giving signs of compression of the right lung. This is the type that usually follows appendicitis. Since the liver does not descend on account of adhesions, the right hypochondrium and the epigastric region are not tender.

2. The right posterior intraperitoneal subphrenic space is represented by the subhepatic pouch, a triangular space bounded laterally by the abdominal wall, in front by the liver and gall-bladder and posteriorly by the abdominal parietes with the apex at the upward slope of the left lobe of the liver. An abscess here will give a swelling in the right hypochondrium and occasionally in the right lumbar region. It is most often combined with other varieties of subphrenic abscesses.

3. The left anterior intraperitoneal space is the fossa bounded by the diaphragm above, the left lobe of the liver behind, the spleen to the left and the falciform ligament on the right. An abscess in this region is due usually to a perforated gastric ulcer. It produces a swelling in the epigastrium and the left hypochondrium with signs of compression of the left lung. This type of abscess always contains gas.

4. The left posterior intraperitoneal space is the lesser peritoneal cavity. Pus occupying the small space may give signs suggestive of a pancreatic cyst. An abscess here is a rarity.

5. The right extraperitoneal space lies between the layers of the coronary ligament of the liver. Infections from the right kidney, the posterior surface of the duodenum and a retrocæcal appendix may burrow along the space pushing the peritoneal reflexion of the liver further and further back and the liver lower and lower in the abdomen. The abscess may extend between the layers of the falciform ligament and point in the mid-line of the epigastrium; and may be incised without opening the peritoneal cavity. This type of subphrenic abscess is to be differentiated from the right anterior intraperitoneal abscess where the liver cannot be pushed down owing to the formation of adhesions.

6. The left extraperitoneal space is situated in the retrocellular tissues of the left loin. Infection in this space arises from the left kidney, pancreas, descending colon, and lumbar glands. The abscess presents itself in the lumbar region. This type is rare.

For further data on the anatomy of the subphrenic space, the reader is referred to the article of Barnard, whose descriptions and illustrations are very instructive. Clinically, it is not often possible to determine which space the subphrenic abscess occupies, and in the literature no special stress is laid on its localization. From the fact that the symptoms in the case described here were mainly thoracic with no downward displacement of the liver, we believe that we were dealing with a right anterior subphrenic abscess. However, as a clinical basis, the classification of Piquand into (1) anterior inferior subphrenic abscesses mainly with abdominal signs; (2) superior subphrenic abscesses with thoracic symptoms; and (3) retroperitoneal abscesses with signs of lumbar swelling, is satisfactory. The case reported in this article probably belongs in the category of superior subphrenic abscesses with thoracic signs and symptoms.

In Piquand's series of 890 cases of subdiaphragmatic abscesses we have the following classification:

Right	Retroperitoneal	132	
	Intraperitoneal	346	
	Combined	19	
	Total		497
Left	Retroperitoneal	19	
	Intraperitoneal	305	
	Total		324
Bilateral			28
Uncertain			41
	Total		890

Right-sided abscesses are more common than left-sided, and the intraperitoneal types outnumber the extraperitoneal abscesses. Bilateral cases are not often seen. After appendicitis, the intraperitoneal variety is the more common.

PATHOLOGY

Various explanations for the collecting of pus beneath the diaphragm have been advanced. The most prominent are the following: (1) Suction action of the thorax during respiration; (2) the lymph circulation from the peritoneal to the pleural cavities through the stomata of the diaphragm; (3) gravitation. This is now the most accepted view. As the patient lies on his back, the kidney and the thick lumbar muscles produce a mound between the subphrenic space and Douglas's pouch in the female and the rectovesical pouch in the male. Pus gravitates to the two depressions produced by this elevation.

In appendicitis, the subphrenic space may be infected in the following ways: (1) as a part of general peritonitis—rare; (2) by slow extension from the pelvis up the lumbar peritoneal fossæ; (3) through the portal vein, as a pylephlebitis; (4) by lymphatic extension (a) up the right retroperitoneal cellular tissue, (b) up the lymphatics, round the deep epigastric artery to the falciform ligament.

Infection by the peritoneal route produces intraperitoneal abscesses; by the cellular tissues, extraperitoneal abscesses; by the lymphatic route, both types.

Abscesses may contain pus or pus and gas. In some unusual cases, bile, fæcal and alimentary contents, echinococcus hooklets and pancreatic juice have been found. Various organisms have been isolated from the abscesses. Bacillus coli has been the most frequent, streptococcus, pneumococcus, staphylococcus less commonly, and anærobes rarely.

Pus and gas in a subphrenic abscess (the pyopneumothorax subphrenicus of Leyden) occur in about 25 per cent of the cases. In a few cases abscesses have contained nothing but gas (Gruneisen, 12). The consensus of authorities is that the gas in a subphrenic abscess may originate in any one of these ways: (1) from the intestine, (2) from the lungs, (3) spontaneously.

When of intestinal or gastric origin, the gas in a subdiaphragmatic abscess is due to the perforation of a hollow viscus belonging to the gastro-intestinal tract. When of pulmonary origin, the abscess communicates with the outer world by rupturing into a bronchus. This is what happened in our case, and the rupture into the bronchus was followed by the expectoration of foul colon pus. In some cases, the presence of gas cannot be explained as arising from gastric, intestinal, or pulmonary sources, and must be regarded as of spontaneous origin. It is true that perforation of the gastro-intestinal tract may have occurred and later cicatrized, a fact which has been proved at autopsy, but in most cases of so-called spontaneous formation of gas, fermentation processes are no doubt responsible. It is a well known fact that anaerobes produce gas in tissues; Legros (13, 1904) has shown that some aerobes possess the same property, and Umber (14) has isolated a fermenting organism in a subphrenic abscess.

SYMPTOMS

1. *History.* The onset of a subphrenic abscess may be acute or insidious. Eisendrath reports a case in which the signs appeared 1 year after an appendectomy. This, however, is unusual, as most of the cases following appendectomy occur during or soon after convalescence. In the acute types, the recognition of a subphrenic abscess may be made simultaneously with the diagnosis of acute appendicitis or may be the first suggestion of the existence of a more or less long standing gastric or duodenal ulcer.

2. *General signs and symptoms* of suppuration are often present. These include pyrexia, tachycardia and anæmia, emaciation, chills, and a polymorphonuclear leucocytosis.

3. *Abdominal signs.* Often a tumor in the hypochondrium or in the epigastric region and even in the lumbar regions may be found with the various types of subphrenic abscesses. Owing to the formation of adhesions, these masses may be immovable. When gas is present, the liver dullness may be obliterated and be replaced by tympany. In many cases, it may be difficult to differentiate subphrenic abscess from general peritonitis, particularly when pain, vomiting and meteorism are prominent symptoms.

4. *Thoracic symptoms and signs.* These are the most common. As a rule signs of pulmonary compression are present. Consolida-

tion of lung tissue or an empyema may be associated with the subphrenic abscess. The heart may be displaced and even rotated. The signs vary in the abscesses with the presence or the absence of gas formation. In the presence of gas, areas of tympany which shift with position may be made out. Dyspnœa and cough are common symptoms and expectoration of fetid sputum may occur with rupture of the abscess into a large bronchus.

COMPLICATIONS

The complications may conveniently be divided into (A) thoracic and (B) abdominal.

A. Thoracic complications. 1. Pleurisy without perforation of the diaphragm may occur through the lymphatic anastomosis of the peritoneal and pleural cavities. The pleurisy may be fibrinous, serofibrinous and even purulent. It is now conceded that definite pneumonic patches lie just adjacent to a subphrenic abscess.

2. Perforation of diaphragm. In the retroperitoneal abscess, the perforation occurs at the junction of the costal and lumbar fibers of the diaphragm whereas in the intraperitoneal variety, its seat is usually in the center of the diaphragm. In size the perforation may vary from a pin-head to half a dollar. Although one perforation is generally present, more may occur.

3. Rupture into the pleural cavity. This event may lift up the parietal pleura so that it becomes fixed to the visceral pleura and the approximation of the two surfaces may act as a barrier against the spread of infection. Most frequently, however, pus escapes into the pleural cavity and the physical signs vary according as the pus is free or localized. When the abscess ruptures near the center of the diaphragm, adhesions occur between the parietal and visceral pleura and wall off the infection, but when it ruptures toward the periphery (costophrenic space) where the lungs descend only on deep inspiration, adhesions are not common and an empyema occurs.

The physical signs vary, of course, according as we have pus alone or pus with gas. With pus we have no difference between the impairment to the percussion note due to the pleurisy and that due to the subphrenic abscess; but in the presence of gas, the following zones are made out from above, down, with the patient in the sitting posture: (a) lung resonance, (b) dullness corresponding to the pleurisy, (c) tympany, gas of subphrenic abscess, (d) flatness, pus of subphrenic abscess.

4. Rupture into the lung. This may result in the formation of pneumonic patches, gangrene, or rupture into a bronchus, with expectoration of pus. If adhesions unite the diaphragm to the lung, the pus may escape directly into the lung without getting into the pleural cavity. If the abscess ruptures into a large bronchus, it may be completely evacuated, but this is rare.

5. Pericardial complications. These can be proven only by autopsy.

B. Abdominal complications. (Not so common as thoracic findings.)

1. *Peritonitis.* Rare. Usually the subphrenic abscess is secondary to a general peritonitis.

2. Rupture into the alimentary tract. Vomiting of pus makes the diagnosis. This is a fatal complication.

3. *Rupture into the bladder or ureter.* Also rare.

4. *Opening through the skin.* The fistula is usually in the right hypochondrium and most of the cases are associated with cholelithiasis and cholecystitis.

DIAGNOSIS

It is important to detect the presence of a subphrenic abscess in order to prevent the various complications detailed above and more particularly to prevent perforation of the diaphragm. A subphrenic abscess which has lifted up the diaphragm may be readily confused with empyema and the differential diagnosis is difficult. Litten's sign is unimportant, but it has been said to persist in subphrenic abscess and to disappear in empyema. Maydl maintained that the heart is displaced upward in subphrenic abscess and displaced to the right or to the left in pleural exudates. On percussion, except in the gaseous type, there is no differentiation possible between the impairment from the pleurisy and that from the subphrenic ab-

scess; more especially is this true for the right side. For the detection of pus below the diaphragm, aspiration with the needle and syringe should always be employed. The needle should be introduced for at least 3 inches, beginning in the tenth interspace in the scapular line. If no pus is found, other trials should be made consecutively in the ninth, eighth, seventh and sixth interspaces. If these do not meet with success the exploratory needle should be introduced in the axillary line, from below up. These punctures may be made with or without a general anæsthetic. Even in the presence of pus, it may be difficult to determine its origin,—whether it arises from above or from below the diaphragm. Fuerbringer's sign is helpful, provided the diaphragm is not paralyzed. If the needle has perforated the diaphragm, it will move up and down with the respiratory movements.

The roentgenogram is an invaluable aid in the diagnosis, and we wish here to emphasize the importance of employing it in postoperative appendectomy cases when the explanation for an elevated temperature is not clear. For the detection of gas, the supine position and the lateral position with the patient lying on the sound side is to be preferred to the sitting posture, when the patient is extremely ill. Fluoroscopy will reveal the form, position, and particularly the movements of the diaphragm and may be employed in individuals who can stand the examination.

PROGNOSIS

The prognosis varies according to the procedure instituted, whether expectant or operative.

		Per cent
Mortality in cases not operated upon	Barnard	100
	Piquand	92
	Perutz	85
Mortality in cases operated upon	Barnard	37
	Piquand	30
	Perutz (16)	20

TREATMENT

There is only one form of treatment and that is surgical. The posterior routes of approach are now conceded to be better than the anterior. The posterior transpleural method with resection of a rib is the method of choice. The diaphragm is fixed to the intercostal muscles with three or four sutures and incised and the abscess is then drained. By this method we also obtain the advantages of draining a complicating empyema at the same time; the only disadvantage being that it allows entrance of air into the pleural cavity and possibly some infection. The method of Elsberg (17), which consists in resecting portions of the ninth and tenth ribs in the axillary line, and, after separating the pleura from the diaphragm incising it, is too often accompanied by tears into the pleura. In our case, the tip of the twelfth rib was resected and the abscess was drained without opening into the pleural cavity. When the abscess points to the abdomen, it may be opened in the midline or parallel to the ribs without getting into the peritoneal cavity. In the retroperitoneal abscesses, the lumbar route is employed.

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ANALGESIA AND ANÆSTHESIA IN LABOR[1]

By EDWARD P. DAVIS, M.D., F.A.C.S., Philadelphia

At the present time much attention is given to analgesia and anæsthesia in labor. The commercial exploitation of so-called twilight sleep drew the attention of the public to this subject. When the true value of this method was appreciated and it was relegated to its proper place amid the resources of obstetrical science, the attention of the profession was engaged by the advocates of the use of nitrous oxid and oxygen in labor. At present the claim has been made that no patient should pass through labor without a thorough and painstaking effort upon the part of her medical attendant to relieve suffering and avoid exhaustion. This claim must be acknowledged to be just and fair, but in the effort adequately to meet it discrimination should be exercised.

That actual suffering occurs during labor and that this suffering is the same as that endured during surgical procedures accompanying wounds and lacerations or under other conditions where nerve filaments are irritated, there can be no doubt. The effort to consider suffering in labor as righteous and inevitable was dissipated by Queen Victoria. It will be remembered that when Simpson proposed to give her chloroform in labor, the bishops of her church forbade because pain was decreed in Scripture as the necessary accompaniment of childbirth. The Queen replied that none of the bishops had ever had a baby and that she had passed through this experience and that her experience should decide and so it did. She was among the first to receive the benefits of chloroform in labor.

However fully we may accept this claim, may there not be at present a tendency to fall into error in the neglect of the physiology of labor and nature's methods to relieve the patient from unnecessary and undue suffering and exhaustion? From our own observation, pain in labor is important in direct proportion as it leads to exhaustion. The fact that physical pain occurs during parturition is met by women of strong maternal impulse as the inevitable price paid for offspring and it is borne by them with courage and patience so long as progress is made. When, however, progress lags and exhaustion threatens, pain passes the limit of physiology and becomes a pathological condition.

Nature's provision for the relief of suffering in labor is much more successful during the stage of expulsion than during the first stage. In the beginning a test is made of the nervous condition of the patient. Nagging pain of uncertain duration and without apparent progress disturbs rest and sleep, and with nausea makes a most distressing condition which may seriously retard parturition. For the relief of this nature has no remedy except the vigorous condition of the patient and her preoccupation in such domestic matters as may divert her attention. In modern life vigorous women are not common and domestic affairs which may divert the attention of the patient from labor are frequently more complicated and worse than labor. As a result many cases of parturition pass from the natural to the pathological because of the tedious and neglected first stage of labor.

The best cure for the abnormalities of the first stage of labor lies in the hygiene of pregnancy. If a woman can be brought to labor with sound nerves and muscles a great gain has been made. If she can be under the care of an experienced and able nurse and if she has the natural maternal ambition and instincts the first stage of labor may often be passed successfully without the use of drugs. The copious and thorough irrigation of the lower bowel will do something to mitigate nagging pain. The frequent emptying of the urinary bladder, the necessary preparation for labor, moving about and occupation will all help to pass daylight hours. The healthy woman may doze during the first stage of labor at night and very often she is unable to sleep and failure to

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sleep is a good preparation for exhaustion. Here in many cases analgesia is demanded and its proper administration is of great value. It can be said that the woman will be prepared for labor in proportion as she has avoided toxæmia in her pregnancy and has practiced well regulated exercise in the open air. With this background if sleep is denied her during the first stage she rightly demands relief.

It is evident that the merit of the so-called twilight sleep lay in the psychic control of the patient and in the hypodermatic use of morphia. While the former is difficult at times outside of hospital, the hypodermatic use of morphine, preferably with atropin, is usually possible. With unruptured membranes there is little evidence that this injures the fœtus, nor does it seriously delay labor. In the presence of nausea a drug hypodermatically given is promptly and efficiently absorbed. Dissolved in various forms it tends to promote dilatation of the cervix and the combination is a reliable and efficient one. The proven objections to scopolamine or hyoscine are the uncertainty of action which may become exciting and its uncertain influence upon the fœtus. In our experience a moderate dose of morphine and atropin has never acted unfavorably upon the child. In one case of excessive nervousness with tedious dilatation of the os and cervix in a neurotic multipara suffering with a mild bronchitis, the hypodermatic use of codein through two nights and three days seemed to produce a condition of mild asphyxia in the child. This, however, did not prove serious and the child was readily made breathe. In cases where patients are admitted to hospital threatened with rupture of the uterus through impacted fœtus and violent uterine contractions, the hypodermatic use of morphia may be necessary until operation can be performed. We have as yet seen no positive evidence that such use of morphine injured the child.

Formerly hydrate of chloral was used with great freedom during the first stage of labor. Some applied it locally upon cotton to the cervix as it was supposed to have a peculiar property in promoting dilatation. When the dangerously depressant effects of this substance became familiarly known its use was greatly curtailed.

During the second stage of labor we believe that an opportunity should be given for the patient to establish the normal physiology of the expulsive operation of parturition. This consists in muscular contraction reaching the crest of its wave energy, followed by a gradual cessation and relaxation, and this to be succeeded by a period of absolute rest and often sleep. If the pulse and pulse tension of the patient undergoing this phenomenon be observed they are found to be surprisingly normal. There is no evidence of exhaustion and it is questionable whether it is well seriously to disturb this condition by anæsthesia. There can be no objection to brief anæsthesia at the point of greatest muscular activity provided the conditions are such that the patient if it were necessary could be promptly delivered. If, however, the conditions are unfavorable for prompt delivery through the vagina, the patient may insist upon anæsthesia and abandon all efforts to help herself in labor.

Pressure upon the pelvic floor is painful in proportion to the lack of development of the genital tract, the size and consistence of the presenting part, its position and presentation, and the condition of the nervous system of the patient. Unquestionably at this stage of labor, anæsthesia should be available and usually employed. Here those who urge the use of nitrous oxid and oxygen believe it to be a specific. Our experience, however, has not led us to subscribe to this somewhat enthusiastic claim. In our experience nitrous oxid and oxygen is not a true stimulant, but is an anæsthetic and asphyxiating agent. Its merit consists in its easy inhalation, its comparative safety, the prompt recovery of the patient. It does not lessen the vigor of uterine contraction, nor does it seriously affect the fœtus. Nor is it a stimulus of muscular and nervous action. In some patients it produces a condition of excitement which is undesirable and it cannot be trusted if the anæsthesia is to be carried to the surgical degree for forceps, version, or embryotomy. With a preliminary hypodermatic injection of morphine, it may

be used for abdominal section. While the apparatus necessary for its administration is comparatively simple, it is more cumbersome and complex than the can of ether and the gauze or simple inhaler necessary for etherization. While we recognize fully the value of nitrous oxygen in labor, we should not be willing to keep a patient under its influence continuously for 5 or 6 hours, nor should we be willing to depend entirely upon it in all cases of parturition.

The best quality of ether skillfully administered is successful in the majority of cases of spontaneous labor during the second stage. If given at the height of the pain, and quickly removed so soon as the pain subsides, it stimulates and does not retard labor; but the moment when expulsion occurs a few deep inhalations without air will render the patient insensible to pain although capable of comprehending sensations of feeling, of hearing, or often of sight. The mother rouses easily after delivery and requires no anæsthesia while the placenta is separating. For the insertion of stitches immediately after labor, ether properly administered with oxygen is comparatively safe and efficient. We have seen no evidence that such use during the stage of expulsion injures the fœtus. It is true that ether is inflammable. that some patients are excited by it, that it is irritating to the bronchial tubes and kidneys, and that it is difficult to anæsthetize some patients with ether, but if skillfully administered it is usually successful and its combination with oxygen renders it in our experience the safest of obstetrical anæsthetics.

For the immediate closure of lacerations it must be remembered that all parts of the genital tract are not equally sensitive. There is not much sensation in the cervix, nor is there great sensitiveness in the pelvic floor. In the skin perineum, especially near the anus, the insertion of stitches causes acute pain. If these facts are borne in mind anæsthesia may vary during the insertion of stitches in accordance with the needs of the patient.

The comparative merits of nitrous oxid and oxygen and ether and oxygen were strictly exemplified in a recent experience.

A multipara was suffering from an hepatic toxæmia. While her urine remained comparatively free from albumin and casts, the ammonia percentage was rising steadily and so was the percentage of creatin and creatinin and rest nitrogen. Vomiting was incessant and uncontrollable, the action of the heart was increasing in rapidity. As viability had been reached it was deemed necessary to induce labor and for this purpose it was suggested that to anæsthetize her with nitrous oxid and oxygen would be useful. A careful physical examination of the patient revealed the fact that the second sound of the heart had disappeared and that the heart was acting badly. There was no asphyxia, but cardiac dilatation seemed threatened. The anæsthetizer wisely declined to use nitrous oxid and oxygen, stating that in his experience a similar patient had suddenly died during the administration of nitrous oxid and oxygen while preparations were made to induce labor. Ether and oxygen were then given and labor was induced. After 2 hours of ineffectual pain, with continued vomiting and bad heart action, it was believed imperative to deliver the patient. Accordingly ether and oxgyen were again administered, dilatation of the cervix was completed by the gloved hand, and the child delivered living by forceps. The action of the heart improved under the anæsthetic and with the aid of vigorous stimulation hypodermatically the patient recovered from her labor. It seemed to us that in this case we were practically limited to ether and oxygen. Chloroform was prohibited by the hepatic toxæmia present and by the condition of the heart.

Patients sometimes express a decided preference for a given anæsthetic in labor. Thus in the writer's experience a patient was given nitrous oxid and oxygen for the induction of labor and when the stage of expulsion arrived it was necessary to deliver her by forceps. Nitrous oxid and oxygen were again administered but failed utterly to anæsthetize the patient and ether and oxygen were substituted. On recovering from her labor the patient made a very earnest request that nitrous oxid and oxygen be omitted in her future obstetrical experience.

Chloride or bromide of ethyl are in use by some for patients in labor. They are easy of administration, pleasant to many patients, uncertain in action, causing in many cases considerable excitement and disturbing the action of the heart. Their use must be exceptional.

It is unnecessary in this presence to draw attention to the fact that modern observations on toxæmia have practically debarred

chloroform as an anæsthetic in many cases of labor. Acute acidosis, acetonæmia, acetonuria, relaxation of the uterus, postpartum hæmorrhage, have all followed the use of this anæsthetic. At one time considered the ideal anæsthetic for obstetrical use, it is now in this country less and less frequently employed. Diluting with cologne of good quality makes it an exceedingly agreeable mixture for the patient, but uncertain in action and of doubtful value. In the experience of the writer the combination of oxygen and ether has proven remarkably successful in parturient women suffering from cardiac, respiratory, or nephritic conditions which formerly demanded the use of chloroform. The writer has recently had occasion to operate upon a number of tuberculous women in various stages of pulmonary tuberculosis, and has employed this anæsthetic with little irritation and good after-results. In one consumptive woman whose case was complicated by valvular disease of the heart, abdominal section proceeded smoothly and the patient made an uninterrupted recovery. It is the practice of the writer to require the administration of oxygen with ether in all obstetrical operations.

The subject of analgesia and anæsthesia in labor is so intimately a part of modern obstetrical science that it may not be amiss to call attention to the fact that modern obstetrical diagnosis has considerably limited the indiscriminate and dangerous use of anæsthetics during labor. Formerly prolongation of labor was considered a valid indication for analgesia and anæsthesia, but in some of these cases accurate diagnosis was wanting. The patient with a contracted pelvis and disproportion might be drugged for several nights and days in the belief that labor must ultimately proceed successfully. Finally, the discovery would be made that a radical operation was necessary, after the patient is brought to face this problem injured by indiscriminate analgesia and anæsthesia to which she had been subjected. So the indiscriminate use of drugs in labor in patients whose toxæmia had not been recognized has added numerous fatalities. We are quite aware of the danger of the indiscriminate use of drugs, such as ergot and pituitrin, especially where no accurate diagnosis of the conditions present has been made. But is there not an equal danger in the indiscriminate use of drugs to produce analgesia and anæsthesia when an accurate diagnosis of the obstetrical conditions is wanting?

In the matter of diagnosis nitrous oxid and oxygen may be exceedingly valuable. For thorough examination of nervous patients, for minor manipulations or the introduction or removal of gauze packing, or the opening of a breast abscess, or for other possible conditions where a brief and not complete anæsthesia is necessary, nitrous oxid and oxygen may be of great value. In inducing labor the writer is accustomed to employ these agents, thus enabling him to dilate the cervix somewhat with the gloved hand, to separate the membranes from the lower portion of the uterus and to introduce from one to three bougies without resistance and suffering upon the part of the patient.

The subject of analgesia and anæsthesia is of peculiar value to the obstetrician, but in the consideration of anæsthesia he shares with the surgeon the study of modern conditions. Unquestionably the administration of anæsthesia is properly today a specialty of surgery in all its branches. The modern anæsthetizer should be prepared to use nitrous oxid and oxygen, ether and oxygen, chloroform with or without oxygen, changing if necessary from one to other of these during a prolonged operation. In special fields of surgery the invention of special apparatus has made anæsthesia vastly more accurate and successful. In obstetrical anæsthesia we believe that the mother is of too much importance to be given to the average trained nurse, or average hospital resident, and that even in spontaneous parturition the services of a skilled anæsthetist should be demanded. The remarkable success of women trained for this purpose introduces into obstetrical practice an element which is agreeable to the patient and of great value to the physician. The patients should be assured when they engage their physician that especial attention will be given to the lessening of suffering and the avoidance of nervous exhaustion. They should be promised such relief as modern

obstetrical science affords, but the physician should insist that he or his anæsthetist should decide upon the agent to be employed.

Economically speaking, this will increase the cost of parturition, but this will be more than compensated by the lessened exhaustion of the mother, her more prompt recovery, the lessening of hospital days, and a better resumption of domestic or other economic duties. For the obstetrician, analgesia or anæsthesia, as skillfully given, make for more accurate diagnosis during labor and for the successful management not only of spontaneous and normal parturition, but of complicated conditions.

It is a familiar fact that recovery from parturition is greatly delayed by exhaustion during labor. In this regard modern analgesia and anæsthesia is one of the greatest advances made by modern obstetrical science.

One must not forget the considerable fœtal mortality and morbidity produced by prolonged birth pressure and by unregulated and violent expulsive efforts. The danger of asphyxia to the fœtus during labor by analgesia and anæsthesia is vastly less than the danger of cerebral or other hæmorrhage from birth pressure, and the avoidance of this latter complication is greatly enhanced by obstetrical analgesia and anæsthesia.

THE TREATMENT OF ABORTION[1]

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NO question in the field of pathological obstetrics has caused more controversy than that of the treatment of abortion. The voluminous literature and the large number of investigating committees abroad and at home testifies only too well that the profession has not come to a definite decision as to the best course of therapy.

From the earliest times there has been a division between those who advise expectant conservative care and those who insist on operative interference. In the treatment of infection of the uterus after labor at term, there has been a decided trend toward conservatism. Each puerpera who has died as a result of vaporization, the use of sharp and dull curette and uterine douche has contributed her bit to this slow progress toward better things. And who shall say she has died in vain? But we cannot say that there has been an equal progress in the therapy of infected abortions. Although it seems that the specialist in obstetrics is tending in the direction of conservatism in both postpartum infections at term and those in the earlier months of pregnancy, it cannot be said that the opinion is by any means unanimous. This is not true in the case of the general practitioner who, imbued with the present-day spirit of activity, feels that he must do something and that something to him means curettage.

To answer this question I undertook the following clinical investigation. I do not pretend to offer anything new but to present a series of cases from the clinic of the Cook County Hospital. These from the standpoint of results alone seem to indicate that the conservative treatment is the best.

After all, the true test of a therapy is result. When the field of bacteriology opened its gates to us, many felt that a solution could readily be worked out on this basis. It is needless for me to point out that up to the present time a therapy based on bacteriological examination of the vagina and uterus has been impractical and has offered no results commensurate with the amount of difficulty in carrying out the investigations. In addition the pathological studies of the uterine content have not been of as much assistance here as abroad, chiefly because of the great difficulty in securing postmortem examinations.

I believe that the problem in the treatment of septic abortion is very much like that which existed in the case of appendicitis. At first the mortality in appendicitis was very high and the complications many, but with the doctrine of operation as soon as the diagnosis

[1]Read before the Chicago Gynecological Society, Apr. 23, 1920. (For discussion see p. 632.) Inaugural Thesis.

is made the mortality in this disease has greatly diminished. From clinical experience, not laboratory, we have learned, therefore, that since the cases that will get well without operation cannot safely be selected, the best results in appendicitis are secured by early operation in every case.

Analogously, since we cannot select the cases of septic abortion for a specific therapy, is it better to curette or to treat expectantly? Granting that some will die regardless of treatment and that some are worse off if curetted and others if let alone, will a greater number receive harm by being curetted or by being let alone? This question can best be answered by clinical experience with the means of diagnosis at hand at present, and is one of the problems discussed in this paper.

As might be expected the staff of the Cook County Hospital has for years had among its members exponents of both methods of practice, and I believe still has, and for the purpose of comparing results of the two methods in this hospital, a study was made of 200 cases of septic abortion taken as they appeared in the files.

All of the 200 cases had a temperature of 100° F. or more on the day of admission. They are divided into a group of 100, in which the uterus was emptied artificially, during the febrile period and as soon as convenient after admission, and a similar group of 100, in which there was no local treatment. The essential features are noted in Tables I and II.

TABLE I

	Curetted Cases	No Local Treatment
Number of cases	100	100
Total days of fever	810	350
Average days of fever	8.10	3.50
Total days in hospital	1328	848
Average days in hospital	13.28	8.48
Complications	19	4
Deaths	3	1
Percentage mortality	3	1

TABLE II.—COMPLICATIONS

Curetted Cases		No Local Treatment	
Type	No	Type	No.
Sepsis	9	Pelvic abscess	1
Parametritis	3	Sepsis and parametritis	1
Phlebitis	2	Salpingitis	1
Pelvic cellulitis	1	Cellulitis of leg	1
Endometritis	1		
Peritonitis	1		
Salpingitis	1		
Hæmorrhage	1		
Total	19	Total	4

The tables are self-explanatory and show strikingly that the cases with no local treatment (conservative) had fewer days of fever, a shorter stay in the hospital, fewer complications and a lower mortality.

Bearing in mind these very definite conclusions for the series of septic cases, I decided to run a second series of *so-called non-septic cases* to compare the results of active and expectant treatment in fever-free cases. The plan of procedure will be briefly explained.

The first premise was that all septic cases should be treated expectantly until fever-free. Only in the case of alarming hæmorrhage, dangerous to life, should the uterus be emptied artificially of secundines. *In the septic case no operative procedure should be carried out until the patient has been 5 days fever-free,*—at which time such a case was regarded as a non-septic case. If such patients are septic, at least they enjoy an immunity which our clinical experience seems to show permits them to be curetted with impunity and with a possible shortening of the convalescent period. This nominal, highly-important period was determined from our clinical experience in the ward by 6 months' observation. At first curettage was done after 3 days of normal temperature but in not a few cases there was an alarming postoperative rise in temperature and the patient's stay in the hospital was prolonged. Experimentation with longer and shorter periods of normal temperature in cases that had been septic showed that the five-day limit was the earliest in which uniformly good results could be obtained. The premise, mentioned above, of treating all septic cases expectantly until fever-free, was of course based upon the conclusions drawn from the 200 septic cases previously analyzed.

Our further procedure follows. Cases were assigned alternately to the operative and expectant treatment lists, when the diagnosis of abortion was made. *Cases on the operative list* were curetted when there was profuse or persistent bleeding or when it was very evident by examination that placental tissue was retained. If the bloody discharge ceased and it was evident that the uterus was empty and abortion complete, cases on the operative lists were not curetted and notations were

accordingly made to that effect. However, the latter cases, though treated expectantly, were not transferred to the list of expectant cases.

Cases on the expectant list were treated as such unless hæmorrhage was very profuse or persistent, when they were curetted. Notations were made accordingly and the cases though curetted remained on the expectant list.

STATISTICS OF THE CHECK SERIES

The parity of the women is shown in Table III.

TABLE III.—PARITY

	PARA												
	0	1	2	3	4	5	6	7	8	11	12	13	Total
Active List	6	10	4	8	7	6	6	4	4	0	0	0	55
Expectant List	10	12	9	6	11	8	3	3	2	1	1	1	67
Total	16	22	13	14	18	14	9	7	6	1	1	1	122

It appears that 38 of 122 cases or 31.14 per cent were paræ nought or one.

The distribution of the cases according to the period of gestation is shown in Table IV.

TABLE IV.—PERIOD OF GESTATION

	MONTH OF PREGNANCY							Total
	1-2	2-3	3-4	4-5	5-6	6-7	?	
Active List	7	23	12	10	0	1	2	55
Expectant List	6	21	21	12	3	4	0	67
Total	13	44	33	22	3	5	2	122

The figures indicate that 77 of 122 abortions or 63.1 per cent occurred between the second and fourth months of pregnancy.

A history of previous abortions was secured in 35 per cent of the series. The average number of abortions for each para group was about the same and the average period elapsing from the time of abortion to admission to the hospital was 5.67 days.

In 68 cases an especially careful attempt was made to determine the etiology with the results shown in Table V.

The spontaneous column included those patients in which history and examination were negative.

TABLE V.—ETIOLOGY OF ABORTIONS

	Spontaneous	Induced Self or Criminal	Associated Pathology or Accident	Total
Active List	20	12	3	35
Expectant List	15	10	8	33
Total	35	22	11	68
Percentage	51.47	32.35	16.17	

The induced or criminal group included: instrumental criminal abortions and the self-induced by catheter, silver wire, metal bougie, slippery elm, vaginal douches, quinine, etc.

In the group with associated pathology or a history of accident there was noted: fibroids uteri, retroversioflexion, hyperemesis gravidarum, syphilis, acute bronchitis, excessive coitus, blows on the abdomen, etc.

The figures indicate that in half the cases the etiology was unknown. The percentage of 32.35 for the group of self-induced and criminal abortions is highly important, for this type of patient is so likely to be infected beyond the secundines and in or beyond the uterus that even the exponents of radical operative treatment could not hope to remove the source of infection by the curette. In addition this class must necessarily be shut out from active interference and is the group which clinical experience has shown die. These are the cases which furnish our mortality statistics almost *in toto*.

The types of abortion are classified in Table VI.

TABLE VI.—TYPE OF ABORTION

	Complete	Percentage	Incomplete	Percentage	Total
Active List	10	18.18	45	81.81	55
Expectant List	19	28.35	48	71.64	67
Total	29		93		122
Percentage	23.77		76.22		

The table indicates that the incomplete abortions were more than three times as common as the complete.

The temperature on admission of the series fell into the groups in Table VII.

TABLE VII.—TEMPERATURE ON ADMISSION

	To 98.8	98.8 to 100	100 and above	Total
Active List	20	14	21	55
Expectant List	27	23	17	67
Total	47	37	38	122
Percentage	38.52	30.32	31.14	

We note that 61.46 per cent of the cases entered the hospital with a temperature above 98.8° F. The percentage of admissions with a temperature above 100° F., presumably with infected uterine contents, was 31.14.

Of the 55 cases on the operative list, 9 were not curetted (16.36 per cent); 2 were too septic, dying respectively on the second and fourteenth days after admission; 7 had no discharge after the fifth day and the uterus was evidently empty.

Of the 67 cases on the expectant list 27 or 40.29 per cent were curetted because of profuse or persistent bleeding, persistent lochia rubra, or subinvolution of the uterus.

Five septic cases that were discharged not curetted returned because of the resumption of hæmorrhage. They were then curetted and did not return again.

TABLE VIII.—TOTAL DAYS OF TEMPERATURE—ACTIVE LIST

	Non-curetted Cases	Curetted Cases	Total	Average
Number of Cases	9	46	55	
Days of Temperature Total	29	115	144	2.61
Days Temp. before Operation	—	80	—	1.73
Days of Temp. after Operation	—	35	—	0.76
Average days of temperature of the 9 non-curetted cases				3.22

EXPECTANT LIST

No.	Days of Temperature		Average
27	Curetted Cases	46	1.70
40	Expectant Cases	107	2.93
67	Total	153	2.28

We note that there was no marked difference in the average total days of temperature of the cases on the active and expectant lists, the former being slightly in excess (2.61:2.28). However, it is interesting to observe that the expectantly-treated cases in each group had a longer course of fever, thus:

Active list:
- Curetted cases 2.49
- Expectant cases 3.22

Expectant list:
- Curetted cases 1.70
- Expectant cases 2.93

Of the 122 cases in the series 78 or 64 per cent had fever at some time during their hospital course, the proportion being greater on the active list (41 of 55—expectant list 37 of 67).

The effect of curettage on temperature is given in Table IX.

TABLE IX.—EFFECT OF CURETTAGE—ACTIVE LIST

Cases with fever before operation 29	Cases with no fever before operation 17	Total
Number that developed fever after operation 12	Number that developed fever after operation 3	15
Average number days 2.08	Average number days 1.66	
Percentage 41.37	Percentage 17.64	
Number that did not develop fever after operation 17	Number that did not develop fever after operation 14	31
Percentage 58.62	Percentage 82.35	
Average number of days of fever for the entire group 0.76		46

The figures indicate that there was a tendency on the part of the patients who had fever before operation to have fever after operation in excess of those who were fever-free before operation. There also was a slight increase in the average number of days of fever in those with pre-operative temperature.

The days of lochia rubra as observed in the hospital are given in Table X.

TABLE X.—LOCHIA RUBRA—ACTIVE LIST

No.	Days of Lochia Rubra		Average
9	Non-Curetted Cases	52	5.77
46	Curetted Cases	240	5.21
55	Total	292	5.30

EXPECTANT LIST

No.	Days of Lochia Rubra		Average
27	Curetted Cases	198	7.33
40	Expectant Cases	171	4.27
67	Total	369	5.50

The expectant list show only a very slight excess in the average days of lochia rubra.

Table XI shows days in hospital.

TABLE XI.—DAYS IN HOSPITAL—ACTIVE LIST

No.	Days in Hospital		Average
9	Non-Curetted Cases	84	9.33
46	Curetted Cases	421	9.15
55	Total	505	9.18

EXPECTANT LIST

No.	Days in Hospital		Average
27	Curetted Cases	280	10.87
40	Expectant Cases	347	8.67
67	Total	627	9.35

There was practically no difference in the length of stay in the hospital of the patients on the two lists. They were discharged from the hospital usually 2 or 3 days after curettage.

COMPLICATIONS AND MORTALITY

There were only two instances where complications occurred, which were associated with or the result of hospital treatment. One case was a bronchopneumonia in a patient who had been curetted 4 days previously. She made an excellent recovery and was on the active list. The other woman was on the expectant list. She was curetted for persistent bleeding, following a self-induced septic abortion, and was discharged apparently well. She returned in 6 days with a parametritis not recognized on discharge.

In addition there were two cases of sepsis, both patients being on the active list. One was a criminal abortion, the woman being moribund on admission and dying within 36 hours. The second was an instance of self-induced abortion. The patient had a marked peritonitis and broken cardiac compensation on admittance and died on the fourteenth day. Neither was curetted in view of circumstances.

There were no other deaths and if we exclude above cases there was no mortality on either list.

SUMMARY OF ESSENTIAL FEATURES

1. A series of 200 cases of septic abortion, divided equally into those curetted and those let alone, showed strikingly that the cases with no local treatment (conservative) had fewer days of fever, shorter stay in hospital, fewer complications, and a lower mortality.

2. A 6 months' clinical study showed that no operative procedure should be carried out in septic cases until they are 5 days' fever-free, when they become so-called non-septic cases.

3. A study of 122 cases of so-called non-septic abortions showed:

a. That 63.11 per cent of abortions occurred between the second and fourth months, and a history of previous abortions was secured in 35 per cent;

b. That 32.35 per cent of the abortions were self or criminally induced and potentially septic;

c. That 61.46 per cent entered the hospital with a temperature above 98.8° F.;

d. That while 9 or 16.36 per cent of the 55 cases on the active list did not have to be curetted, 27 or 40.29 per cent of the 67 on the expectant list had to be operated upon;

e. That five septic cases that were discharged not curetted returned because of resumption of hæmorrhage;

f. That there was no striking difference between the active and expectant lists in average days of temperature, lochia rubra, and stay in the hospital;

g. That there were only two complications and the mortality was nil.

CONCLUSIONS

1. Cases of septic abortion should receive no local treatment until they are at least 5 days' fever-free; the one exception being hæmorrhage that threatens life.

2. This nominal period converts a septic case into a so-called non-septic, which has fewer days of fever, a shorter stay in the hospital, fewer complications, and a lower mortality.

3. So-called non-septic cases should be curetted as a routine for:

a. 40 per cent of expectantly treated cases have to be curetted,

b. Curettage insures an empty uterus and prevents subsequent bleeding,

c. It shortens the stay in the hospital,

d. This procedure is relatively harmless in comparison with the good it accomplishes.

PREGNANCY COMPLICATED BY INFLUENZA[1]

By SAMUEL A. DURR, M.D., Chicago

DURING the recent recurrence of the influenza epidemic, there were 53 cases of acute epidemic respiratory infection among the pregnant women in Cook County Hospital. These cases, together with a similar but larger group reported by W. J. Woolston and D. O. Conley, form the basis of this paper.

They reported 101 cases observed in the same hospital, during the preceding year. In their group, 52 or 51.4 per cent died, and 75 per cent of the patients who died, suffered an interruption of pregnancy, either abortion, premature labor, or labor at term. The incidence of abortion among those who recovered was 42 per cent, somewhat less than in the cases who died, but still considerably larger than we have observed this year. In their group, no effort was made to classify the patients as to whether or not there were any signs of pneumonia complicating the influenza.

We observed two distinct types of cases: first, those of uncomplicated influenza, the clinical picture of which is so familiar as to need no elaboration; and, second, influenza complicated by pneumonia. Cases presenting typical physical signs of pulmonary consolidation, with leucocytosis and fast pulse, instead of leucopenia and slow pulse, as in typical influenza, together with marked dyspnœa, cyanosis, and often hæmoptysis, were considered influenza complicated by bronchopneumonia. The division into two clinical groups was made because of the marked difference in mortality and morbidity they showed.

Among the 21 cases of influenza, there was only one death, which gave a maternal mortality of 4.1 per cent. The patient, a quintipara, delivered a normal baby at full term, and in fairly good condition. She was extremely toxic, and possibly for that reason, labor seemed to be painless, and extremely rapid. Following delivery, her temperature rose to 105°, and she died a few hours later. None of the other cases suffered an interruption of pregnancy, and all of them recovered completely, without complications.

Thirty-two of the patients had influenza complicated by bronchopneumonia, and in this group the results were very much worse. Twenty-six, or 81.2 per cent, died, and 7, or 21.9 per cent, delivered either at term or prematurely. Three of the patients delivered babies of over 7 months' gestation, and all of these children lived. Only one of the mothers of living children recovered; the other two succumbed several days after parturition. Complications observed were 2 cases of suppurative pleuritis, 1 of otitis media, and 1 of femoral thrombosis.

The mortality for both groups was 50.9 per cent, which is practically the same as in the preceding year (51.4 per cent). The incidence of abortion was much lower, being only 15 per cent, as compared to 60 per cent in the Woolston and Conley report. This may be explained by the fact that the patients more fully appreciated the gravity of their condition, and came to the hospital earlier in the course of the disease. In this connection it might be added that only 4 cases of pneumonia developed in the hospital, the other 28 having had unmistakable evidence of pulmonary consolidation on entrance.

The cause of abortion is purely speculative. It might be due to fœtal death, which in turn could be caused by direct infection of the placenta and fœtus, by toxæmia, or by insufficient available oxygen in the maternal blood. The last two might conceivably cause strong enough contractions of the uterus to expel the products of conception, before the fœtus died. It is more than probable that continued exertion on the part of the mother, such as coughing, is of some importance. In a postmortem examination of a still-born fœtus, there were no gross or microscopic evidences of direct infection, either in the placenta or the fœtus. A postmortem cæsarean section was done by D. S. Hillis upon a woman who

[1]Read before the Chicago Gynecological Society, April 23, 1920. (For discussion, see p. 632.)

died of pneumonia. In spite of the fact that the fœtus was delivered within 2 minutes of the mother's death, the fœtal heart was not beating, and all efforts at resuscitation failed.

The earliest cases were by far the most severe, and the gravity of the new cases decreased steadily. During the first few days, all of the patients either died shortly after entrance, or were desperately sick, so that at one time we seriously considered the advisability of inducing labor in all cases where the fœtus was viable, not only to save the child, but possibly increase the mother's chance of recovery, by giving the lungs more room in which to expand.

CONCLUSIONS

1. The maternal mortality was about the same as in the epidemic of 1918-19.

2. The mortality and morbidity, while small in cases of influenza, was much greater in those complicated by bronchopneumonia.

3. The incidence of abortion and of pneumonia is greatly decreased by keeping the patients in bed, from the time the diagnosis is made until recovery is complete.

4. Abortion is caused by toxæmia, or insufficient available oxygen in the maternal blood, with physical exertion as a contributary factor.

5. The virulence of the epidemic decreased steadily and markedly.

PARASACCULAR OR SLIDING HERNIA

By C. H. CRILEY, M.D., Los Angeles, California
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PARASACCULAR or sliding hernia has been referred to by various names as extrasaccular, *parglissement*, and adherent hernia of the large intestine. The names having been applied in some instances to express the anatomical position, in others to express the probable etiology.

Some of the best descriptions of this type of hernia have been given by English and American surgeons, notably Weir, Hotchkiss, Carnett, Walton, Moschcowitz, and Rockey.

In the ordinary types of abdominal hernia, a sac or pouch of peritoneum is forced through a weak place in the abdominal wall. Into this sac, gliding freely and smoothly, is forced a loop of intestine or omentum, or other viscera. These viscera are completely reducible into the abdominal cavity without affecting the sac, unless complicated. However, in the production and formation of an abdominal hernia, a peritoneal sac is not absolutely essential. Herniæ of several different viscera without peritoneal sacs have been reported, as have a considerable number in which the sac is incomplete, surrounding the viscera, partially, or on one side alone. These para- or extrasaccular herniæ are essentially and fundamentally different from an ordinary hernia which has become adherent to its sac by inflammatory adhesions or otherwise (1).

Of the cases here presented, 7 involved the colon or large bowel in some portion, and 2 involved the bladder. All were inguinal herniæ, 6 appearing on the left side and 3 on the right. The six cases occurring on the left side were quite similar, involving the fused portion of the descending, or iliac, colon and differed only in size and extent. Before operation these herniæ all appeared to be of the ordinary inguinal variety. Upon opening the sac the content of the small bowel, or omentum, was readily reduced, but there remained a portion of large bowel which could not be separated from the sac without tearing. This attachment was always along the posterior wall of the sac, and bleeding was quite profuse when torn.

On examination it was found that the hernial sac did not surround the large bowel but passed over it anteriorly, covering approximately one-half or two-thirds of the circumference, and leaving the remaining part

posteriorly without any peritoneal covering. The relation between bowel and peritoneum is identical to that found in the lumbar region of both ascending and descending colon, where it is possible to do a colostomy without entering the peritoneal cavity. It does not resemble the condition found when the completely covered sigmoid, freely movable on its mesentery, drops into a hernial sac.

In one case of right sided hernia, Case 5, we found an abnormal type of fused cæcum and appendix which had been dragged down into the posterior wall of the hernial sac. The cæcum normally develops as a pouching or budding outward of the colon, and has no mesentery nor direct attachment to the abdominal wall. But the size, relations, and position of the cæcum are subject to considerable variations. In position it may be arrested at any point along the course of its development and rotation, having been found frequently high up under the liver and rarely as far around as to be under the spleen (2). Likewise excessive rotation and development carries it entirely beyond the pelvic brim producing an excessively mobile cæcum floating in the pelvis. This latter type of cæcum is a fairly frequent content of hernia but does not occupy a parasaccular or sliding position.

The relation of the cæcum is also affected by the extent to which the fusion continues between the posterior leaf of the mesocolon and the abdominal wall. This fusion normally ceases one-half inch above the ileocæcal junction. In this case the fusion had continued abnormally low, to within an inch of the head of the cæcum and likewise along the meso-appendix and appendix for two-thirds of its length, so that these structures were without peritoneal covering except in front. In this condition they were herniated through the inguinal canal with the sac lying entirely anterior. The sac was opened and some adherent omentum easily separated and reduced. The posterior sac wall, including the cæcum and appendix and continuous with the parietal peritoneum, was dissected up from the underlying muscles and fascia. The appendix was dissected out and excised. The freed cæcum was then replaced within the abdomen and the peritoneum reduced to normal position and the redundant portion trimmed away and sutured. The inguinal region was then repaired by modified Bassini technique, and the patient left the hospital in good condition.

Moschcowitz, in discussing these herniæ, describes two varieties: one in which the fused cæcum is dragged downward by the attached peritoneum as it descends into the posterior wall of the sac; another, a more rare variety, also described by Tuffier as hernia *en bascule*, in which the fused or uncovered portion of the cæcum lies over or adjacent to the internal ring. This retroperitoneal part is then forced into the inguinal canal, and as it goes through, it is stripped of its peritoneum entirely just as a glove would be turned and stripped from the hand. In such cases there would be no peritoneal sac at all, and the authors have stated that it is rather difficult to find and identify the various anatomic tissues and structures involved.

It is generally conceded that these parasaccular and extrasaccular conditions in hernia are at least in part due to a sliding downward of these fused portions of the large bowel. The explanation of the condition is simplified if we remember that the descent of the testis is in reality a sliding hernia which occurs as a normal condition. The testis originates in the genital ridge mesial to the wolffian body in a retroperitoneal position. In the later fœtal months, it descends and herniates through the inguinal space or canal, accompanied by a peritoneal process or sac known as the vaginal or funicular sac. Dr. White tells me that this sac precedes the testis. However, it lies entirely in front of the testis, gradually surrounding it somewhat latterly to form the tunica vaginalis.

If we substitute for the testis in this picture the fused or partially retroperitoneal portions of the colon, it will well represent the conditions found in the sliding herniæ of the large bowel, which likewise herniates through the abdominal wall with a peritoneal pouch in front of it. In two cases of sliding hernia of the bladder, approximately three-quarters of an inch of bladder wall had been dragged down by the attached peritoneum into the mesial wall of the hernial sac.

From a diagnostic standpoint these herniæ present nothing unique. It has been frequently stated that this type is limited to the aged, to large herniæ, and to those of long standing. It certainly is unsafe to conclude that, therefore, small herniæ in young individuals cannot be sliding hernia or parasaccular. Four of the cases in this group occurred under the age of 42; one occurring at 36, one at 41, one at 39, and one at 26 years of age.

Difficulty of reduction and retention has been considered a probable diagnostic sign of sliding hernia, and is present in a majority of cases. However, two of these cases had no special difficulty in that way, and one case, R. D., boasted of his ability so perfectly to retain and disguise the hernia that he has been able to pass several railroad examinations before being rejected, although the hernia had been present over 15 years.

Bismuth enema and X-ray have been used to determine the presence of colon in the hernia but does not give any information as to its intra- or extra-saccular position. With our present means, differential diagnosis must await the operation, and even then it is not easy in some cases to identify the structures immediately. Cases are reported in which the colon was so completely without sac that it was opened in the belief that it was the sac (3). Similar cases are reported regarding the bladder.

These sliding herniæ have been mistaken for ordinary herniæ with adhesions. The dissimilarity between parasaccular and ordinary herniæ is conclusively demonstrated in a study of the embryologic development of the parts involved.

In the early weeks the cœlom or abdominal cavity is formed as a single space into which the abdominal viscera emerge from a posterior position. As the viscera are projected into the cavity they push before them the lining membrane or peritoneum, which covers them on their ventral surface and becomes reflected on some to form a mesentery.

By the seventh week, the intestines have grown too long to remain straight within the abdominal cavity and the process of coiling begins. The colon makes almost a complete loop. The cæcum passes upward toward the

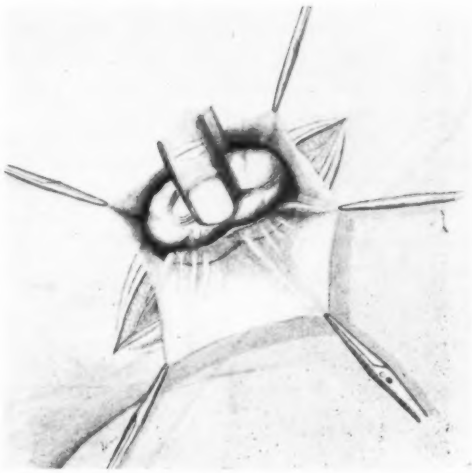

Fig. 1. The descending colon with its posterior fusion to the abdominal wall has slid 2.5 inches through the hernial canal in or behind the posterior wall of sac. Case No. 3.

spleen and the cardiac end of the stomach, across under the liver and down to its final resting place at the level of the sacro-iliac joint, arriving during the eighth fœtal month. With the completion of this progress and rotation, certain changes take place in the peritoneum forming the mesenteries. First the transverse mesocolon fuses with the duodenum and the dorsal wall; and the mesentery of the duodenum atrophies and becomes obliterated, as does the lower part of the central mesentery. Next the dorsal layers of the mesenteries to the ascending and descending colon become fused with the posterior peritoneum and atrophy or are converted into connective tissue. In a small percentage of cases this fusion is absent or incomplete. This fusion and obliteration of peritoneal tissue is not a result of pressure or traumatism as has been assumed by some. It is as much a part of the regular embryologic development as is the bowel rotation, or the transitory formation of the notochord, the bronchial clefts and arches, or any other of the definite stages in development.

In the normal or usual condition there results from this fusion and degeneration a positive and permanent fixation of these portions of the colon to the posterior wall. This

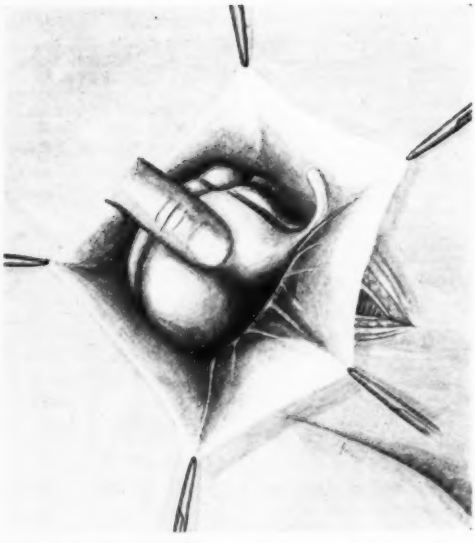

Fig. 2. Abnormal fusion of cæcum and appendix to posterior abdominal wall, with sliding hernia. Case No. 5

fixation extends from the iliocæcal region upward to the point where the transverse colon crosses the duodenum. Very frequently the fixation extends downward affecting the cæcum and appendix. On the left side, this fusion extends from the splenic flexure to the iliopectineal line. The atrophy and degeneration of these layers leaves then, over this area, only a single layer of peritoneum which represents the anterior leaf of the original mesocolon. Beneath this in the areolar tissue separating it from the abdominal wall are situated the nerve and blood supply to the colon, which had also been carried along in the original mesentery by the growth and rotation of the bowel.

The position and relation of these nerves and vessels are of the utmost importance in cases where the fused colon and its anterior layer of peritoneum are forced down into the hernia, as these nerves and vessels are carried along between the colon and the mesial wall of the sac. They are certain to be seriously torn by extensive attempts to free the sac from the fused viscera, and cases are reported (4) in which such damage resulted in fæcal fistula and recurrence of the hernia. In other instances, it has been necessary to resect the involved portion of the bowel (5).

However, these nerves and vessels can be readily stripped up from the posterior abdominal wall along with the large bowel and the posterior part of the sac. This stripping or dissection may be carried upward beneath the peritoneum for any desired distance and the bowel with its unharmed nerve and blood supply and with the mesial layer of peritoneum may be replaced within the abdomen.

The ordinary type of hernia in which the content becomes adherent to the sac, either by inflammation, pressure, trauma, or otherwise, may resemble the sliding types somewhat, but examination will reveal several distinct structural differences. Here the peritoneal layer or sac is continuous entirely around the adherent viscera. Separation of the adhesions is comparatively easy, and does not involve tearing the main nerve and vascular supply to the viscera. It is a condition in which a freely mobile segment, either small bowel, transverse colon, or sigmoid, swinging by a mesentery has become adherent after entering the sac.

In all the cases whose histories follow, we were able to dissect up the posterior part of the sac and parietal peritoneum with the attached viscera, from the underlying abdominal wall sufficiently to replace in approximately normal position without severe kinking. The redundant peritoneum is then excised and sutured; and the inguinal space repaired in the usual manner.

In two cases which were fairly extensive with considerable parasaccular bowel, it was found when the bowel was replaced that a large part of the sac was necessarily retracted along with it to be replaced on the posterior wall from which it had slid downward. This left but a small amount of redundant sac to be trimmed away.

The operation of splitting and reversing the sac to reconstruct a mesentery as has been advised by Weir (4), Walton (6), and others did not appear to be suited to the cases on which we tested it, as it produced in them a decided constriction and torsion of the blood supply.

CASE 1. January 18, 1917. Fred S., a waiter, age 42. Previous diseases include curvature of the spine which was noted when he was 27 years of age. Diagnosis of Pott's disease was made at the time and extensive treatment including the use of braces was continued for a considerable time with excellent results. Six years ago a left inguinal hernia suddenly appeared as a result of a heavy lift. Increase in size has been gradual, and at present it extends well down into the scrotum. It was always reducible but difficult to retain, and occasionally caused slight pain. Constipation has been obstinate ever since the occurrence of hernia.

Operation at County Hospital. Oblique sac isolated and opened. Content was a loop of approximately 3 inches of descending colon fused with the posterior wall of the sac and not separable. Examination showed it to be parasaccular in type. Redundant portion of sac removed and closed by sutures. Fused portion of sac and parietal peritoneum dissected upward away from the posterior abdominal wall, until the attached colon could be replaced within the abdominal cavity without kinking or tension. Closure by Bassini technique. Examination 4 months later showed the repair in excellent condition and the constipation apparently cured.

CASE 2. 1917. Mr. J., age 65, Methodist Hospital, Dr. Duffield's case. Left inguinal hernia of 15 years' duration. Increase in size gradual but progressive. For the past 6 months, it has been irreducible. At present it is about 4 inches in diameter.

Operation at the Methodist Hospital by Dr. Duffield and Dr. C. H. Criley. The sac contained omentum which was somewhat adherent, but was easily separated and reduced; and a loop of descending colon 2.5 inches of which was in a parasaccular position on the posterior wall of the sac. The redundant portion of sac was excised and the opening sutured. The sliding part of the descending colon and the posterior parietal peritoneum stripped upward until the colon could be easily replaced without severe kinking. The hernia was repaired by the modified Bassini technique. Wound infection developed with breaking down of most of the repair, and of a small hernia, 1.5 inches in diameter, recurred at the lower angle of the wound. This recurrent hernia was repaired on February 26, 1918, by imbrication of muscles and aponeurosis with kangaroo mattress sutures. August 1, 1918, recurrence at the lower angle of the wound had again taken place.

CASE 3. June 30, 1918. Wm. F., male, age 69. Chief complaint was bilateral hernia of only 8 months' duration.

Operation at the County Hospital, Dr. Kessler assisting. Right side: an ordinary oblique inguinal hernia containing some omentum was easily reduced and repaired by the Bassini method. Left side: an oblique inguinal hernia containing 2 inches of descending or iliac colon in parasaccular relation

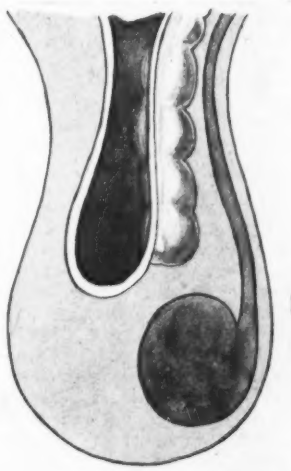

Fig. 3. Diagrammatic sketch showing the partially extraperitoneal relation of the colon to the hernial sac.

was corrected with technique similar to that used in Case 1. Convalescence was normal and the patient left the hospital in 3 weeks, apparently cured.

CASE 4. July 18, 1918. Jose S., male, age 41. Previous history negative. A left inguinal hernia had appeared 3 weeks previously from severe strain. It was of moderate size, extending about 1.5 inches below the external abdominal ring.

Operation at the County Hospital. Oblique sac containing 2.5 inches of descending colon was found in parasaccular relation. Technique was used similar to that in Case 1. Convalescence was normal, and the patient left the hospital cured in 2 weeks.

CASE 5. August 1, 1918. Warren M., male, age 40. A right inguinal hernia of one year's standing was easily reduced but difficult to retain. Slight pain frequently from pressure.

Operation at the County Hospital. An oblique sac contained the cæcum and appendix. Approximately 0.5 inch of cæcum and nearly the full length of appendix were parasaccular in position. Much difficulty was encountered in dissecting loose the appendix without damaging the blood and nerve supply to the cæcum. The appendix was ligated and excised and the stump buried with a purse-string suture. The posterior peritoneum and attached cæcum were then dissected upward away from the posterior wall until the cæcum could be replaced in normal position. The redundant sac was excised and closed with sutures. Repair was accomplished by modified Bassini technique. The patient left hospital in 2 weeks, cured.

CASE 6. August 26, 1919. W. S., age 55. Suffered from a hernia of the right inguinal region, for 15 years.

Operation at the Methodist Hospital, Dr. Linhart assisting. A direct inguinal hernia, with sac very broad at base and practically no neck was found. A small, shriveled, fibrous appendix was removed through the incision. In isolating and examining the sac it was found to be unusually thick on its inner wall and quite fat. Examination continued within the peritoneal cavity revealed a pouch of bladder approximately .75 inch in diameter extending into the inner wall of the hernial sac. The sac was ligated one-half inch away from bladder pouch which was then inverted and held until the muscles and aponeuroses were closed over it by modified Bassini technique. The patient suffered gas pains on the following day but thereafter his convalescence was uninterrupted. Examination on October 4 found condition excellent.

CASE 7. October 2, 1919. R. D., male, age 50. Left inguinal hernia 24 years. Moderate distress was sometimes noticed after standing for some time. Reduction was easy and his ability to retain the hernia by his own effort was remarkable, having passed several strict railroad examinations without detection of the hernia.

Operation at the County Hospital. An oblique hernia containing 1.5 inches of descending colon was found lying behind the sac. The technique used was similar to that used in the preceding cases. Condition 2 months later was excellent.

CASE 8. December 10, 1919. Ben S., male, age 62. Left inguinal hernia present 12 years and easily retained by truss. Right inguinal hernia of 1 year but has been difficult to reduce and retain.

Operation at the County Hospital, Dr. Lester assisting. A left oblique sac contained a small loop of descending colon in the posterior wall, which was replaced with its attached peritoneum and the opening sutured without removing any of the sac. Repair by the Bassini method.

A right oblique sac appeared empty, but on examining a rather thick, slightly fat fold on the mesial wall of the sac, a pouch or diverticulum of bladder was found extending downward about one inch in the wall of the sac. It was indentified by tracing through to the bladder. The sac was successfully trimmed away a full half inch from the pouch, and sutured. The bladder pouch was then inverted and repair finished by the Bassini technique. On the sixth night the patient had a nightmare, got out of bed and walked about the ward. However, he left the hospital in 3 weeks apparently cured.

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TWO HUNDRED FIFTY OPERATIONS ON THE GALL-BLADDER AND DUCTS[1]

By EDGAR R. McGUIRE, M.D., F.A.C.S., Buffalo, New York

THAT gall-stones have their origin in a primary cholecystitis seems to be one of the few fairly well established facts in connection with biliary disease. Personally, I have always held to the view that the infection is invariably hæmatogenous in origin and is not the result of direct extension. The rôle played by metastatic infection in the causation of many diseases is gradually becoming clearer. Whether we accept in its entirety the work of Rosenow with relation to the selective action of bacteria, there can be little question that most obscure infections are metastatic in character. I presume biliary infections can arise from any hidden focus but probably they most frequently follow an abdominal infection, particularly an infection in the appendix. Since I have appreciated this fact I have been astonished how frequently I have found a diseased appendix, when gall-stones are present. I have made it a rule to remove the appendix in every case of gall-bladder disease unless there is some definite contra-indication. The rôle played by typhoid infection has received rather too much emphasis. At most it is not a causative factor in more than 10 per cent of cases and probably less. It does, however, illustrate excellently the metastatic production of such infections; a primary lesion in the intestinal canal infecting the bile through the blood stream.

The most frequent organisms found are the streptococci, the staphylococci, colon and typhoid bacilli, possibly in the order named. So many cultures from gall-bladder stones remain sterile, it is very difficult to secure accurate statistics regarding the bacteriology of stones.

In nearly every clinic, gall-stones are almost three times as frequent in women as in men. From the point of etiology, this is rather difficult to explain. Of course, we have pregnancy, pelvic infections and perhaps a more sedentary life, as possible explanation, but if we adhered to the bacterial origin of gall-stones it is difficult to see how these factors play such an important rôle.

The diagnosis of gall-stones is usually not a difficult procedure. I am not a believer in the statement that a large percentage of people with gall-stones have no symptoms. Careful histories will usually show that these patients have had a mild initial infection and a prolonged secondary stage in which the symptoms are largely gastric in character. There comes a time sooner or later when attacks of pain of varying severity occur in the right upper quadrant. The most important detail in the diagnosis is a careful, time-consuming history. This should begin with the initial infection and follow up to the present attack, step by step. The X-ray is probably second in importance in making the diagnosis. I believe its greatest value lies in the negative information obtained; it eliminates other causes of pain such as gastric and duodenal lesions. Duodenal ulcer with slow perforation at times very closely simulates gall-stone disease. Some roentgenologists claim the ability to determine a high percentage of gall-stone shadows, and I firmly believe that the time is not far off when gall-stones will be almost as accurately diagnosed by the X-ray as renal stones are today.

Frequently very accurate information may be obtained from the duodenal tube. By relaxing the sphincter of Oddi, bile from the common duct can be obtained and this finding is very valuable in all cases where any infection is present in the duct. Of course, in stones confined to the gall-bladder, the bile is frequently sterile, and little help will be obtained in such instances. While the same is frequently true in common duct stones, there is usually a time, however, when careful observation will show a rise in temperature, if only for a few hours, possibly slight jaundice, and, if the duodenal tube collects the

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bile immediately following, it will show evidence of infection. We are too prone to look upon the common duct stone as completely obstructing the flow of bile, and this is rarely the case. When a stone engages in the common duct, the duct invariably dilates, and very soon this stone is floating in the stream — thereby allowing free drainage of bile. Persistent jaundice due to stone, occurs only when a large stone becomes engaged in the ampulla, or when many stones actually block the duct. Some of the cases with small stones in the common duct, are almost free from symptoms, and this has given rise to the name, "the silent common duct." The name is quite theatrical, but if one really listens carefully, it is usually not silent — merely indistinct.

In the treatment of these lesions it is difficult to lay down hard and fast rules, as so much depends upon our subsequent knowledge. For instance, if Rosenow's work proves to be correct, and I believe it will, that the infection is in the wall of the gall-bladder, and not confined to the mucous membrane, then the surgeons of the future will be compelled to do a cholecystectomy in nearly all cases of stones in the gall-bladder. When one sees at autopsy on a case of cholecystitis in an animal, the swollen œdematous gall-bladder, it is a revelation. It would seem as though the infection must have penetrated all coats of the gall-bladder. If this is correct, we cannot hope to cure the disease by drainage of the inside of the gall-bladder. I have no doubt that in most instances, after the stones have been removed and drainage instituted, the disease subsides, but the primary elements of infection still remain, the exciting cause of future stones. Again, if tying off the cystic duct acts in establishing a permanent drainage of the common duct, it means that even in common duct stones and in chronic pancreatitis, the operation of choice is cholecystectomy. Judd and Mann have done considerable work to ascertain the effect of tying off the cystic duct. The resistance of the valve of Oddi produces a dilatation of the common duct. This continues until the pressure of the small biliary radicals in the liver and that from the walls of the common duct, force the valve to give way. When the pressure is finally equalized, there is more or less continuous flow of bile from the common duct into the duodenum. This is an exceedingly important point, and should actual experience show it to be clinically true, it will mean that cholecystectomy offers not only a more efficient method of drainage, but also gives us the added advantage of draining the bile into the duodenum, instead of into a bottle.

There can be no doubt that many cases are not relieved by simple drainage of the gall-bladder. Any one who has seen these cases reopened, and has seen the dense adhesions between the gall-bladder and surrounding structures, will wonder why more patients do not have pain. Temporary obstruction must occur, which prevents easy filling and emptying of the gall-bladder, and the failure of cholecystostomy permanently to relieve the patient is a problem which it is exceedingly important to settle. In my own series there were 15 cholecystostomies — 4 originally operated upon by me, and 11 by other surgeons — that later necessitated cholecystectomy. Of these, 6 contained stones at the second operation, but as 2 of these had stones in the cystic duct, I am satisfied that they were overlooked at the previous operation. The remaining 4, however, were done by good men, and as the stones were in the gall-bladder, they must be considered as cases of true recurrence of stone. In one instance the patient was originally operated upon by one of the best men whom I know, and yet, 2 years later, I removed over two hundred stones from this patient's gall-bladder. These cases are almost invariably cured by cholecystectomy. The old operation of sewing the gall-bladder to the abdominal wall, certainly ought to be abandoned, and while properly invaginating the peritoneal coat and dropping the gall-bladder back into its normal position is less objectionable, in my hands it has not been nearly as successful in permanently relieving these patients, as cholecystectomy.

When a stone is lodged for any length of time in the cystic duct, its removal is followed by ulceration and contraction, and finally

stricture. The telltale clear mucus without bile, is positive evidence of obstruction to the cystic duct, whether it is present at operation or comes on later, following cholecystostomy. Cholecystectomy is imperative in every case of stone in the cystic duct. In common duct stones the problem is not so simple. Reasoning in a similar way, stone in the common duct ought to be followed by stricture, and if so, the gall-bladder ought to be left for an anastomosis with the duodenum, so the bile could pass around the stricture. Courvoisier's law — that obstruction inside the duct gives a contracted gall-bladder — is probably true in about 85 per cent of cases. The reason is, of course, plain, because before the stones reach the common duct they have produced an old contracted gall-bladder. So the argument does not hold good for common duct stones: first, because the common duct always dilates, making ample room for the stones, so contraction does not occur; and secondly, even though it did, an old contracted gall-bladder could not be used for an anastomosis.

The conditions described are not always present. In cases of stone in the common duct with a fairly normal gall-bladder, one might consider a simple cholecystostomy, but since we find a diseased and contracted gall-bladder in 85 per cent of these cases, even here, cholecystectomy is the operation of choice. One must learn to palpate the common duct accurately so that he can be positive whether stones are present or not. In some instance it may be necessary to open the common duct and introduce a probe or finger, positively to determine the presence or absence of stones, but I think stones can be detected in most instances by introducing the finger into the foramen of Winslow, and milking the duct between the fingers.

I always drain in the presence of stone in the common duct. Usually a catheter with an open end is introduced into the hepatic end, and fastened with catgut. I also try to plug around it with oil silk, to prevent leakage. All drains are removed early, the oil silk in 24 hours, the catheter as soon as the catgut sutures will permit — usually 5 or 6 days. I have never seen stricture of the common duct follow these operations.

Recently I have analyzed all the gall-bladder cases of which I have accurate record. There were slightly more than 252 operations, of which 117 were cholecystostomies, and 135 were cholecystectomies. Every case dying in the hospital was considered an operative death. In the 117 cholecystostomies, there were 7 deaths, 5.9 per cent mortality; and in the 135 cholecystectomies there were 6 deaths, a mortality of 4.4 per cent. In my earlier work, cholecystostomy was used in such favorable cases as uncomplicated gall-stones and cholecystitis without stones, but in later years all these were treated by cholecystectomy. The mortality in each of these procedures will depend largely upon what operation is used in the complicated cases — as those deeply jaundiced, perforation with or without walling off, and cancer of the pancreas. Perforations produce an estimated mortality of 33 per cent. This does not seem possible, but it was true in my cases, and Deaver mentions the high mortality due to perforations in a large series of cases. Cancer of the pancreas in my hands has a very high mortality, if the patients are allowed to stay any length of time in the hospital. The duration of life in cancer of the pancreas following drainage is short, and I doubt the advisability of any operative procedure except where the diagnosis is in doubt. One hesitates positively to condemn a deeply jaundiced patient without exploration, because the difficulty of diagnosing between cancer of the pancreas and stone in the common duct is sometimes quite marked. Where one is satisfied of the diagnosis of cancer of the pancreas, however, I am of the opinion that the patient lives longer without surgery. The cancer cases were all treated by simple drainage which explains the high mortality of cholecystostomy. Of the 7 deaths, 4 were due to cancer of the pancreas, leaving 3 deaths to other causes; perforation, or one case where acute peritonitis had already been established, common duct stone in a very old man with damaged kidneys, and presumably angina pectoris, in a patient subject to attacks of this malady, although no autopsy was allowed. In further analyzing these cases, if we eliminate cancer of the

pancreas the mortality is 2.5 per cent. The case of spreading peritonitis was hardly chargeable to cholecystostomy, as the patient died from an already established peritonitis. The two other deaths were desperate cases and in any operative procedure, would probably have resulted in death.

In the 135 cholecystectomies there were 6 deaths. Two of these were due to perforation with walled off abscesses, but as stones were present in the cystic duct, cholecystectomy was imperative. Both of these cases died of pneumonia. Of the others, 1 death was due to pulmonary embolism, the patient dying on the twelfth day (autopsy). One developed intestinal obstruction on the seventeenth day, as she was ready to leave the hospital, but refused further operation. One died in 12 hours, with a very rapid pulse and œdema of the lungs. The abdominal wound was opened after death, but it revealed no cause of death, and a complete autopsy was not allowed. The last 1 died on the fifth day, cause of death unknown, as no autopsy was allowed, but death was probably due to peritonitis.

The mortality in operation upon the biliary tract is largely due to such complications as perforation with abscess, jaundice, and malignancy. If, for instance, we view these cases in another way, we find there were 196 cases where the disease was confined to the gall-bladder. In these, there were 4 deaths, a mortality of 2.0 per cent. In uncomplicated stone in the cystic duct there were 28 cases, with 1 death, or a mortality of 3.5 per cent. There were 20 cases of stone in the common duct, with 1 death, a mortality of 5 per cent. In perforation with spreading peritonitis and walled off abscess, there were 6 cases, with 2 deaths, the mortality jumping to 33⅓ per cent, while in cancer of the pancreas, the mortality was 50 per cent. This would seem to be a very appealing argument in favor of operation at a time when the disease is confined to the gall-bladder. A surgeon with a high percentage of cystic and common duct stones, is unfortunate in his medical friends, as they haven't learned the necessity of early operation, when the disease is limited to the gall-bladder. The gospel of early operation in diseases of the biliary tract should be preached with the same enthusiasm as that which was formerly done in acute appendicitis.

While death from cancer, pneumonia, pulmonary embolism, angina pectoris, and intestinal obstruction, does not seem to be dependent upon operations on the bile passages, at the present time death from such cases occurs with more or less regularity, and I know of no way of preventing it. Mortality records are uncertain and more or less dependent upon how fortunate one is in escaping these bad pitfalls. For instance, in the last 53 cholecystectomies, there were no deaths, and while this is partially due to increased experience, it is also due to good fortune in escaping many of the complications mentioned above. In any large series of cases, however, these apparently unavoidable deaths do occur with definite regularity, and must be considered in accurately estimating the death rate.

While this experience is not large, it represents over 252 patients, all of whom have been pretty thoroughly studied. In spite of this, I hesitate to speak in a very positive manner regarding the two operations: cholecystostomy and cholecystectomy. There has been a good deal of misinformation written regarding both operations, and it has become a rather delicate subject. I realize cholecystostomy is probably safer in its immediate mortality, but it is not so safe when viewed from the ultimate cure of the patient. Yet, if it became general knowledge that cholecystectomy were the established procedure, I am fearful of the mortality in the hands of the inexperienced operator. Progress, however, can only be obtained by definitely establishing the truth, be the consequences what they may.

In the hands of the experienced operator, the morality of cholecystectomy in uncomplicated cases ought not to exceed 2 per cent. I believe we have arrived at a point where the mortality in each of these procedures is sufficiently low, that the indications for each can be judged on its merit. It is no longer just to dismiss the subject by saying the mortality is too great in cholecystectomy.

In certain instances there seems to be special indications for biliary drainage, and for many surgeons this is the factor deciding in favor of cholecystostomy. In answer I would say: (1) Most indications for biliary drainage disappear with removal of the gall-bladder. (2) Ample drainage can be established by a tube in the cystic or common duct. (3) Probably a very efficient drainage is established through the common duct when cholecystectomy is done.

In the performance of cholecystectomy there are a few essentials which I regard as absolutely necessary to success: (1) accurate dissection of the cystic duct so that one may see it, and know that he is tying it, and tying nothing else; (2) absolute control of hæmorrhage; (3) complete removal of stones from both the cystic and common duct; (4) in uncomplicated cases a small strand of oil silk placed down to the cystic duct; (5) in common duct stone, a tube drain inserted in the common duct. Many may question the fourth point, but I have seen so many cases where a small collection of bile formed around the cystic duct — probably from under the surface of the liver — which produced a temperature about the eighth or tenth day, that I now drain every case. I am quite sure also, that I have seen less disturbance in the chest, since draining all these cases. When these details are carried out, I do not think the mortality in uncomplicated cholecystectomy will be much greater than in simple appendectomy.

From my own experience, I am quite sure that the operation of cholecystectomy has not a sufficiently increased risk to condemn it for that alone, as is frequently done. The question has to be decided on the percentage of ultimate cures. Judged from this standard I leave it to all unbiased observers to decide which is the operation of choice. For myself, the percentage of cholecystectomies has increased yearly, until now I rarely do a cholecystostomy in the presence of gall-stones in any locality.

CONCLUSIONS

1. All gall-stones have their origin in a primary cholecystitis.

2. Typhoid bacilli is present in only 7 to 10 per cent.

3. The mode of transmission of the primary infection is not positively determined. I am of the opinion that it is almost always carried by the blood stream, and rarely, if ever, by direct extension. It is probably more frequently associated with a primary lesion elsewhere in the abdomen.

4. A diseased appendix is very frequently present when stones are found in the gall-bladder. It is probably the cause of the primary cholecystitis in more instances than is commonly believed.

5. Gall-stones are rare in young people. In less than 15 per cent was the patient under thirty years, while over 60 per cent occur between the age of 30 and 50 years.

6. Jaundice has received too much emphasis as a diagnostic symptom. Probably when the primary cholecystitis is present, a goodly proportion have a mild jaundice, but it is slight and usually forgotten. Stones in the gall-bladder or the cystic duct produce jaundice, only by pressure on the common duct, or by associated cholecystitis.

7. Attacks of pain in right upper quadrant is most frequent symptom of stones.

8. Cholecystectomy is the operation of choice where there are stones in the gall-bladder or cystic duct. It is probably the operation of choice where stones are in the common duct, if one is positive all stones have been removed, because stones in the common duct are so often associated with old contracted gall-bladder.

9. The mortality from cholecystectomy is now sufficiently low so that decision for or against the operation should be judged largely by the percentage of ultimate cures.

10. In cancer of pancreas, the mortality is so high that operative procedure is prohibitive. If operation be done, anastomosis between gall-bladder and stomach is the one of choice.

RETROPERITONEAL SARCOMA

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THIS article deals with the report of two cases and a review of the literature upon the subject of retroperitoneal sarcoma to April 1, 1920.

Case 1. Mr. S. P., age 53; resident of Roanoke, Virginia; nationality, American; admitted to Jefferson Hospital, January 20, 1920, complaining of a "large swelling in lower abdomen."

Present illnesses. Since January, 1919, patient has been annoyed by pains in abdomen, which were similar in character to those preceding a bowel movement. These pains always occurred at night, usually two and three times a week until the summer of the same year. Patient had relief by going to stool, but he rarely defæcated at these periods. In July, 1919, he noticed a small swelling about the size of an acorn, one and one-half to two inches below the umbilicus and in the mid-line. This was hard, round, and, according to the patient, freely movable under the skin. At this time, the pains began to occur in the day time as well as at night, having approximately the same intervals. From that time until his admission to the Jefferson Hospital, the swelling has rapidly increased in size and, at present, is larger than a cocoanut, slightly movable, hard and nodular, but not attached to overlying skin. The pains described were the only symptoms up to one month ago, during which time he has steadily lost his desire for food, has polyuria, nycturia, is extremely constipated and has lost considerable weight and strength. No history of trauma. Habits are negative except that the patient drinks six cups of coffee daily.

Patient had mumps, measles and chickenpox in childhood.

Eyes, ears, nose, and throat are negative.

Examination of the cardiorespiratory system reveals nothing abnormal.

The gastro-intestinal and genito-urinary tracts show nothing abnormal except for present illness.

The patient had heisserian infection at age of 17; he denies lues.

Impression: retroperitoneal sarcoma. (Figs. 1 and 2).

Operation and subsequent course. Patient operated upon January 21, 1920. The growth was found to be about 12 inches in its largest diameter, firmly adherent to the transverse and descending colon and sigmoid. It was so intimately attached to the great vessels that it was impossible to deliver the tumor complete. However, as much as possible was dissected out, the sigmoid and transverse colon cut across, and the growth carefully delivered. Patient died January 25, 1920.

Pathological examination. Gross description. Tumor weighs 5¼ pounds, is multilobular, and has cauliflower appearance. It is everywhere covered with pale, smooth, glistening, and firmly adherent capsule. Lobes are all firm in consistency and no area of fluctuation or softening can be found. The transverse and descending colons are firmly attached to anterior and left lower surfaces.

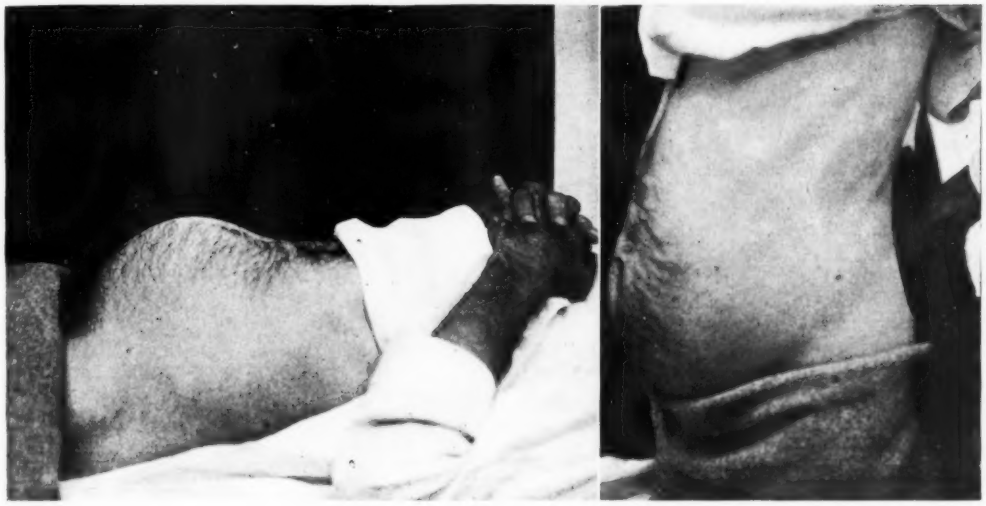
On sections, specimen when cut gives feeling as if knife were cutting through gristle. Internal structure has pale, yellowish-gray appearance. Content is everywhere solid and multiple, and minute arborizations are visible running in every direction; these having no orderly arrangement. Throughout section are areas between branchings and larger islands elsewhere, that are white in color and firmer to touch than the tumor proper, which gives one the impression of a hyaline degeneration. Tumor measured 18½ inches in greatest and 13 inches in smallest diameter (Figs. 3 and 4).

Microscopical examination. Sections show branching arrangement of spindle shaped cells, bundles of which run in every direction. There is a moderate amount of a homogenous intercellular material in which there are but few blood-vessels and absolutely no visible cell structure. This substance stains faintly pink with eosin, undoubtedly a degenerative process. Among the living cells, many mitotic figures are present, and the capillaries are quite numerous all having a fine, delicate lining of endothelial cells.

Accidents and operative history. Fracture of left leg in 1906.

Patient's mother died at age of 72 from abdominal tumor (?); father died at age of 70, from paralysis; two brothers died in infancy; four sisters living and well; one brother living and well. No familial history of tuberculosis or cancer (?).

Physical examination. On admission, temperature 97.6°, pulse 70, respiration 18. Average weight 150 pounds; present weight 133 pounds. The patient looks emaciated and cachectic. The skin and mucous membrane show slight anæmia. There is no tenderness over any of the sinuses and antra. The pupils are equal and react equally to light and accommodation, no nystagmus, no conjunctival jaundice. Ears and nose are negative. The teeth are in bad condition; over half of upper and lower are missing and the remainder show marked pyorrhœa alveolaris. The tonsils are present and show no enlargement or infection. Uvula and pharynx negative. The thorax is of the scaphoid type with nothing unusual present over surface. Respiration is equal on both sides. Point of maximal impulse not visible. Heart, point of maximal impulse located in fifth interspace, 2 centimeters



Figs. 1. and 2. Retroperitoneal sarcoma.

inside nipple line. There is no enlargement to the right or left. Sounds are clear and distinct at apex and base, there are no murmurs, shocks, or thrills present. In the lungs there are no areas of impairment made out on percussion. Breath sounds present nothing unusual in character throughout both lungs. There are no râles.

With patient in recumbent position, examination of the abdomen shows a large, well defined mass, which is movable to a slight degree, is visible—no abdominal pulsation noted. Swelling extends from umbilicus to 4 centimeters from symphysis pubis, and about 5 centimeters to right and left of median line at greatest width. It is about the size of a large head of cabbage and gives one the impression of being similar to a 6 months' pregnancy. On palpation it is found to be rather firm, nodular, and slightly movable under the skin, enough to assume its separation from the skin. The mass can be palpated laterally as far down as it is possible to feel and gives one the impression it is attached posteriorly. No pain is elicited anywhere on pressure of tumor and no area of fluctuation is felt. The intestines are palpable to right and left of growth and on anterior lower border (Steele's observations). It is dull to percussion except over lower anterior border where a tympanitic note is elicited. Auscultation reveals nothing. The liver, spleen, and kidneys are not palpable, and there is no tenderness in any abdominal quadrant.

The external inguinal rings on both sides easily admit index finger, and a definite impulse is felt on coughing. Testicles and penis negative. The upper extremities are negative; the lower show no œdema.

The anterior and posterior cervical and the inguinal and femoral glands are palpable, but no remarkable enlargement is present. Axillary and epitrochlear glands are not palpable. Knee kicks, Achilles, supinator, biceps and triceps reflexes are present, but not increased or diminished; umbilical and cremasteric present and active, Babinski, not present.

The temporal, brachial and radial arteries are palpable, but show no evidence of arteriosclerosis.

Radial pulse is regular in rate under good tension, and has good volume. Blood pressure, systolic 140, diastolic 90.

Examination of urine shows, color, amber; reaction, acid to litmus paper; specific gravity, 1.024; albumin, none; sugar, none; bile, none. Microscopic examination shows epithelial cells and a few white blood corpuscles.

Routine Wassermann examination of blood, negative. Red blood corpuscles 4,000,000; white blood corpuscles, 12,400; hæmoglobin, 80. Differential count, polymorphonuclears, 76.3.

Polymorphonuclear basophiles, .7; polymorphonuclear eosinophiles, 2 7; large lymphocytes, 7.3; small lymphocytes. 22

Diagnosis. Spindle cell sarcoma. (Figs. 5 and 6).

In 1904, J. Dutton Steele (1), in a classical article, reviewed the literature on retroperitoneal sarcoma and collected 96 cases, including those under his personal observation. This review was his second paper upon the subject; his first appearing in 1900, when he reported 61 cases. During the intervening 4 years he collected the remaining 35, some of which had been overlooked, or had been inac-

Figs. 3 and 4. Gross specimen of tumor.

cessible to him at the time of his first summary. The others, 14 in all, except 5 of his own cases, had been reported by various men since 1900.

Steele's latest article is undoubtedly the best review of this subject up to 1904, and, as far as we know, still retains that prestige. Briefly stated, he drew the following conclusions:

1. Retroperitoneal sarcoma is not so very unusual.

2. It occurs most frequently during the first, fourth, fifth, and sixth decades of life.

3. The course is brief, the average interval in 58 of his cases was eight and one-half months between the time of their first detection and operation or death.

4. The most common point of origin is the lateral portion of the abdomen, and the right side is most often affected. The tumor is usually lobulated, encapsulated, and prone to degeneration in early stages. Metastases occurred in one-third of the cases, and are most often found in the liver and lungs.

5. Symptoms are indefinite gastric disturbances, depending upon the position and size of tumor, and relation thereto of the hollow viscera and other organs.

6. Point of most value in diagnosis of condition is relation of stomach and intestines to growth. The only characteristic sign is the tendency of this type of sarcoma to degenerate early in its course.

7. Only treatment consists in early surgical interference. (It will be remembered Steele's article was written before radium had been tried on this type of tumor, and his seventh point at that time was well taken.)

From 1904 up to the present time, we have been unable to collect from the literature but 10 cases, which had undergone operations, and with our 2 cases a total of 12. Two of these were reported by Petron (2) in 1915. Walters and Hall (3) in 1907 reported a retroperitoneal sarcoma of Douglas' pouch, and Le Conte (4) in 1908 reported one of an undescended testicle, in the retroperitoneal region, strangulated by a twist.

As far as we have been able to ascertain but three of the series were operated upon successfully, and strangely they were the largest of the group in which weights were reported. One of these was reported in 1912 by Duff (5), the second by Bull (6) in 1919, and the third operated on by Trout in 1906.

Bull's case was indeed remarkable because of its huge size; the tumor after removal weighing 34 pounds. Microscopical examination showed it to be a myxofibrochondrosarcoma. The patient was a machinist 54 years old and had the usual indefinite abdominal pains, beginning 10 years before operation. The tumor became palpable the sixth year. Since no mention was made in Steele's article as to the weight of any of his reported cases, we believe this to have been the largest one thus far given to the literature.

In 1906 Trout removed a retroperitoneal growth, weighing 22 pounds, from a woman 42 years old. This patient was last heard

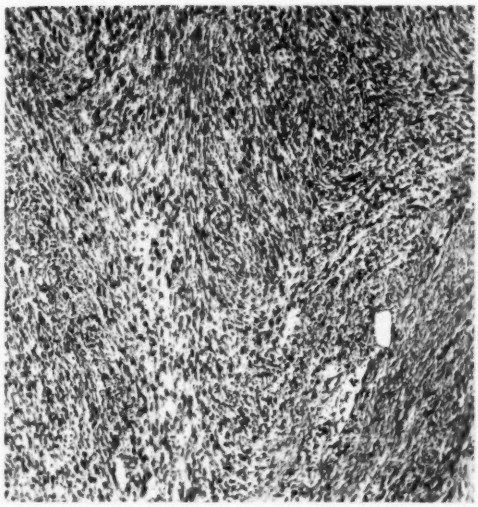


Fig. 5. Low power photomicrograph of tumor.

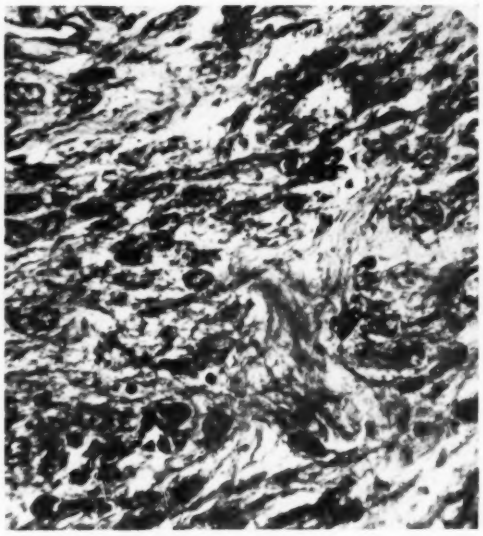


Fig. 6. High power photomicrograph of tumor.

from in August, 1916, when she was apparently in good health, with no signs of local recurrence or metastases. A microscopical diagnosis of spindle celled sarcoma was made at the time of operation, but, unfortunately, neither the slides nor specimen is available for such a confirmation as is now desirable, especially after an apparent recovery of a rapidly growing malignancy. The duration of this growth was 8 years, with a rapid increase, 2 months prior to operation.

The fact of the largest growths having given the best prognosis leaves room for the conjecture that these tumors might have been removed in a transitional period, when a benign growth was degenerating into a malignancy. This surmise is further strengthened by the fact that all three of these cases existed over a period of years, not months, before increasing rapidly in size. It is also possible there might not have been a microscopical confirmation of the operative diagnosis.

The other cases collected were reported by Sheldon and Corbett (7), Munro (8), Johnston(9), and Balloch (10).

As we have said before, we believe Steele's article is still the premier classic upon this subject and during the intervening 16 years since its publication, nothing new has been offered that would in any way alter his conclusions. Regarding his seventh point, C. F. Burnam, of Baltimore, has had some very remarkable results in treating sarcomata with huge doses of radium, and when considering the universally unsatisfactory terminations of the definitely malignant retroperitoneal tumors after operations sufficiently extensive to remove completely the growth, it, indeed, brings up the question if it would not be better to use this agent either in conjunction with surgery (by removing the growth as far as condition of patient and the anatomical consideration will permit with safety and then implanting the radium, to be withdrawn through a tube left *in situ* after sufficient dosage has been obtained), or rely entirely on tremendous doses of radium. Certainly if the growth is clinically malignant, as evidenced by a sudden rapid increase in size; the condition of the patient not good, as is usually the case; and one is able to obtain sufficiently large doses of radium, then we feel the surgeon is justified in, at least, trying this method before resorting to surgery. Of course, when used with surgery, a definite microscopical diagnosis is possible and, while

such is always more satisfactory to the surgeon, there are instances when this method of obtaining information has not been altogether gratifying to relatives of the late patient.

Our only disagreement with Steele's conclusions would be concerning the frequency of such growths. We have noted the earliest case reported in his series was in 1832 (11). Our 12 with his 96, brings the total up to 108. Surely 108 cases reported in the literature, at least the available literature, can not be considered very common.

Again, in going over our own hospital records, we have found but three other admissions for retroperitoneal sarcomata; these three were all found to be inoperable.

Therefore, we are led to believe this condition is just uncommon enough to be wrongfully diagnosed by the profession at large, and, since early diagnosis is the fundamental point concerning the patient's chances of recovery from operation, we feel this article has not been undertaken in vain if it will keep this abdominal possibility before the diagnostician's mind.

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DEPARTMENT OF TECHNIQUE

AN INSTRUMENT FOR THE APPLICATION OF RADIUM TO TUMORS OF THE BLADDER

By WILLIAM H. WOOLSTON, A.B., M.D., Chicago

VARIOUS instruments and methods have been devised and used in radiumtherapy as applied to the bladder. It is unquestionably true that the application of radium by some method other than through a suprapubic cystotomy would facilitate matters to such a degree that it would be used with greater safety to the patient and, therefore, more frequently than it is at the present time. Radium needles have been used in carcinoma of the bladder but there is the risk of losing the needles, and the method is successful only when the needles can be applied to an easily accessible tumor. Lewis, of Baltimore, has invented a very ingenious apparatus for the implantation of radium emanation points and has successfully treated tumors of the bladder in this manner. Some surgeons have found, however, that a slough occasionally develops where the glass capsule containing the radium comes in contact with the tissues, since the capsule is not removed but is allowed to remain in the tissues permanently.

By the use of the instrument which I shall describe, the radium in a platinum, silver, or gold capsule may be attached to the tumor of the bladder through a direct operating cystoscope. It is allowed to remain for the desired length of time and is then easily removed without more discomfort to the patient than is experienced in the usual cystoscopic examination.

The capsule is made of platinum, silver, or gold, preferably of platinum, since the use of a dense metal permits the capsule to be correspondingly thin. The end of the capsule has the clip attachment made of a watch spring, as illustrated (Fig. 1 and Fig. 2*c*). Its points are sharp so that they grasp the tissues firmly. The arms of the clip, which cross each other forming a figure-of-eight, are firmly imbedded in the end of the capsule. When drawn into the forceps the closed end of the figure-of-eight is compressed, opening the jaws of the clip. The opposite end of the capsule resembles that of any other capsule having a screw end and an eyelet for the attachment of a strong silk cord or fine wire.

The forceps used to attach the capsule to the bladder wall has a hollow cylindrical shaft about 14 inches long with a hollow obturator or plunger. This type of instrument has proven to be most successful.

Another type of forcep is one with a shaft of small diameter to the end of which is screwed a cylinder about 1½ inches long and of sufficient

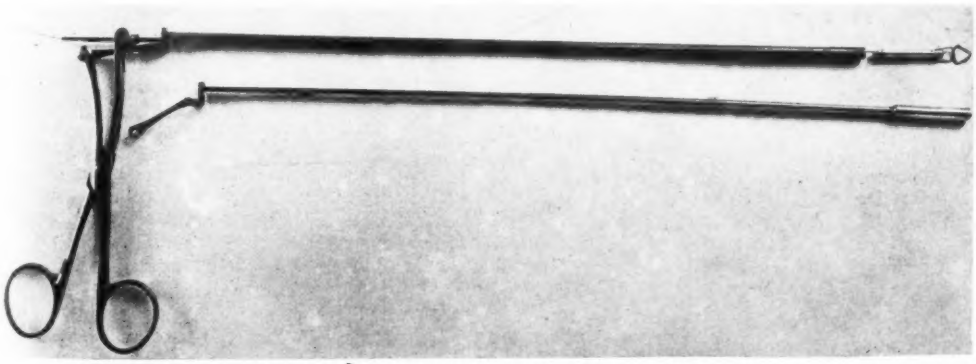


Fig. 1. Photograph of cystoscope showing capsule with clip attachment by means of which the capsule is held in desired position.

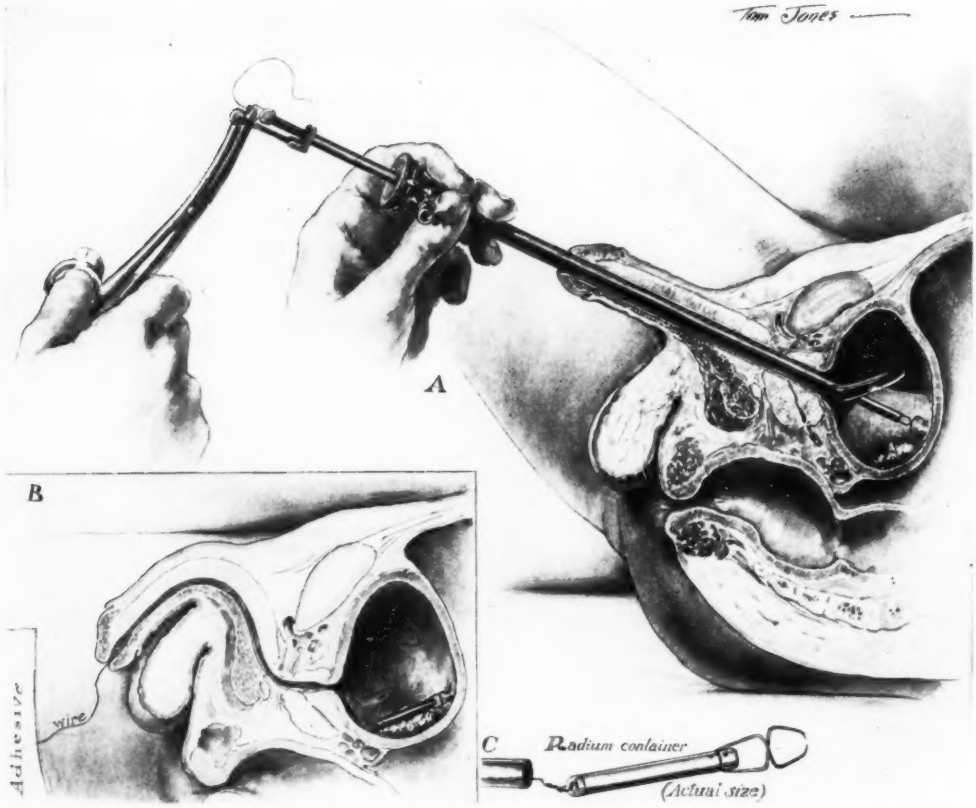


Fig. 2. Drawing showing the technique of applying radium preparations, *a*; capsule in position, *b*; and radium ontainer, *c*.

diameter to admit the capsule. This instrument does not obstruct the view into the bladder as much as does the one of larger diameter but it is more difficult to use because the shaft must be detached in order to insert it through the eyepiece of the cystoscope. By means of the obturator or plunger of the instrument, the capsule is expressed and the spring clip released, the latter grasping the tissues as it closes. When the clip is attached and the instrument removed the guide of silk or wire running from the capsule through the urethra to the outside is fastened to the thigh with adhesive until the radium is taken out.

In order to remove the capsule the guide of silk or wire is threaded through the obturator of the applicator and the capsule is engaged into the end of the instrument. When the obturator is withdrawn and traction put on the guide, the capsule is led into the forceps, the clip is compressed at the proximal part of the figure-of-eight, its jaws are opened, and the tissues released from its grasp.

The bladder should be kept distended with 5 or 6 ounces of sterile water while the radium remains. If this is not done the walls of the bladder will fall together and a burn may develop on the normal mucosa. In case the patient urinates while the radium remains attached, water or boric solution should be instilled at once. This is an advantage over the application of radium through a suprapubic cystotomy in which case the bladder cannot be distended and its walls kept apart.

This instrument can be used only through a direct operating cystoscope. In the female a Kelly cystoscope makes this method of application very simple. The capsule may be attached

just above the tumor on the normal mucosa so that the capsule itself hangs over on to the growth, or attachment may be made to the tumor itself if it is large enough. Sufficient capsules to cover the entire tumor may be applied if desired. The guide of silk thread or fine wire obviates a search for the capsule and is necessary to engage it in the instrument upon removal.

This method of application may also be of value in tumors of the œsophagus and otherwise inaccessible locations.

The suggestions and advice of Dr. Allen B. Kanavel have led to this method of the intravesicular use of radium and the development of this instrument which has been used in his clinic at Wesley Memorial Hospital.

FINGER AND TOE NAIL EXTENSION

By J. E. M. THOMSON, M.D., Lincoln, Nebraska

OF the methods of applying traction to the fingers and toes for various conditions necessitating such procedure, each has its drawbacks. However, the use of nail extension has overcome, to a great extent, certain disadvantages of other methods.

That of narrow adhesive plaster strips applied to the fingers in a manner similar to that of applying adhesive for leg extension is perhaps used most universally. Yet in the hands of one who is not aware of the untoward effects of its wrong application, serious ischemic damage to the digits may result. It has been my sad fortune to see cases of gangrene of the finger due to binding adhesive strips, in which amputation of a portion of the finger necessarily followed. Further, when extension is desired for the last phalanx or for the articulation of the second and third phalanges, it is indeed difficult to facilitate adherence of the plaster strips to such a small area.

Both in the army and on returning to civil practice it has been my custom whenever possible to use a so-called finger or toe nail extension. A small hole is bored through the center of the nail, just beyond the skin, care being taken not to injure the soft tissues or cause any hæmorrhage under the nail. Through this hole is drawn a strong silk thread.

For fractures of the toes, a rather heavy wire, bent in the shape of an arch about the width of the foot, is embedded in a foot cast, the arch extending beyond the toes about 2 inches. Over the arch are tied the threads from the nail (Fig. 1). Traction may be regulated with a twisting stick. A similar extension arch may be used on the hand when multiple extensions are desired. However, in the case of single extension, a splint exactly similar to the Thomas knee splint, but in proportions that are adaptable to the length and circumference of the injured finger, has proved a most prac-

Fig. 1. Illustrating mild traction.

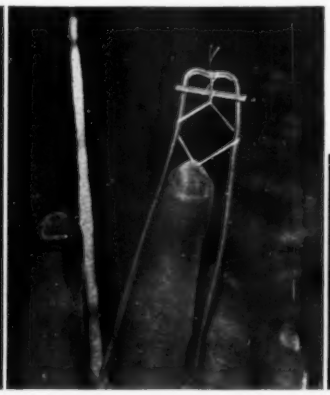


Fig. 2. Strong traction applied.

Fig. 3. Flexion of finger.

ticable apparatus for finger extension. These splints have been made, as the occasion arose, out of small stiff wire, the ring firmly padded with a single wrapping of soft calfskin leather. A well-fitting ring is essential to the comfort of the patient and the successful use of the splint. The end of the splint should extend beyond the end of the finger about 2 inches. The thread from the nail is attached over the extremity of the splint exactly similar in application to that of extension for the thigh in a Thomas knee splint. Traction here is also regulated by a twisting stick (Fig. 2). The splint can be bent, thus giving flexion or extension to any part of the extremity, as the condition may require (Fig. 3).

After the application of the traction the patient may have some discomfort, due to the consciousness of the constant pull on the nail; but this usually subsides after the first 24 hours. Only the most gratifying results have followed this procedure.

This method of extension is especially indicated in the treatment of —

1. Compound fractures of the digits, as it does not interfere with the use of a moist dressing.
2. Simple fractures of the first, second, and third phalanges, with or without overriding. Also, it has proved successful in the handling of certain fractures of the metatarsals and metacarpals.
3. Acute or chronic joint affections, due to injury or arthritis when extension or flexion of the joint is essential during the treatment.
4. Post reconstructive operations on the fingers or toes.

THE USE OF THE TENDON OF PSOAS PARVUS AND FASCIAL TRANSPLANTS IN THE TREATMENT OF PROLAPSE OF PELVIC VISCERA

By GEORGE C. BRYAN, M.D., F.A.C.S., Walla Walla, Washington

THE end-results of operation for prolapsus uteri are often anything but satisfactory. If the pelvic viscera do not actually drift down again the subjective symptoms are still decidedly annoying. Many women are left with neurasthenic tendencies, as a result of pelvic reflexes, which are no credit to the operator. If the uterus is anchored to or implanted in the anterior abdominal wall, the patient is left in an abnormal nervous state and still continues to complain of dragging sensations no matter how firmly the uterus may remain where it has been put. If any of the peritoneal reduplication or so-called uterine ligament methods are used the weight must be carried more or less on peritoneal folds, and dragging sensations must and do constantly recur. If hysterectomy is performed the other pelvic viscera still will sag downward, in spite of being relieved from the weight of the uterus. The Watkins and Mayo operations are both fairly satisfactory but both are unnecessarily mutilating, and besides the end-results are not invariably perfect.

Why the ligament of the psoas parvus has not been used long before this for the purpose of supporting the sagging pelvic viscera is a question which is hard to answer. On account of its structure and position it is apparently ideally placed there for that very purpose. The writer has made use of the three following techniques:

Technique 1. In all operations for prolapsus it is, of course, understood that the pelvic floor shall be so thoroughly built up as it is possible to do. Preferably this should be done at a preliminary operation. Then a week or so later the abdomen is opened by mid-line incision to the umbilicus, the patient placed in the Trendelenburg position, and the intestines tucked back with gauze or rubber tissue packs. Incision is then made through the peritoneum covering the psoas parvus tendon in the iliac fossa on each side opposite the central point of the true pelvis. The tendon is identified, retracted into the abdominal cavity, and is followed down to its insertion into the iliopectineal line. It is then severed as closely as possible to its iliac attachment. With a long, curved forceps the peritoneum covering the iliac fossa and broad ligament is dissected by working forceps beneath it, and a small opening is made in the peritoneum directly over and at the origin of the round ligament where it leaves the uterus. Then another forceps is passed behind the first one. The free end of the psoas parvus tendon is grasped and drawn inwardly through the broad ligament subperitoneally, emerging at the peritoneal opening over the

round ligament. The psoas tendon is now looped around the origin of the round ligament and sutured with linen or silk. A reef is taken in the round ligament so as suitably to shorten it, the suturing being done in such a manner as to cover over the attachment of the psoas tendon to the round ligament, leaving all structures with a peritoneal covering. The peritoneal incision in the iliac fossa is then inverted with a few catgut stitches. An identical technique is followed on the opposite side, and the abdominal wound is closed in the usual manner. Sometimes it is advisable to leave the shortening of the round ligament until after both psoas tendons have been attached as outlined above. This leaves the uterus in a perfectly normal position with its whole weight and that of its attachments swinging freely in the pelvis on four guy ropes, the posterior two of which are made up of the psoas parvus tendons and the anterior two of the shortened round ligaments.

Technique 2. A band of the fascia lata 1½ inches wide by 8 inches long is taken from the right thigh and immersed in normal salt solution. The abdomen is opened as in Technique 1. The psoas parvus ligament is cut down upon, identified, and raised into the abdominal cavity. The peritoneum covering the iliac fossa and broad ligament is dissected loose, a strip of fascia lata ¾ inches wide is looped over the psoas tendon, and sutured with silk or linen. The free end of fascia is then drawn subperitoneally through the broad ligament, brought out at the origin of the round ligament, carried around the round ligament, and sutured in place with silk or linen. The round ligament is then shortened as in Technique 1, the incision in the peritoneum over the psoas tendon is closed, the same technique followed on the opposite side and the abdominal incision closed. The connective-tissue structures which carry the weight and the sutures are all buried under a peritoneal covering so that no adhesions ensue. The whole proceeding is simple, the operation may be done rapidly, and the surgical principles involved are all well established.

Technique 3. It is, of course, understood that the sphincter is suitably shortened before this operation is performed. Then a week after the first operation the abdomen is opened by right rectus incision, the right psoas parvus tendon dissected free, followed to its pelvic attachment, and severed. The peritoneum is dissected free from the iliac incision over the psoas tendon to a point beside the rectum and 2 inches below the promontory of the sacrum. The free end of the psoas tendon is carried subperitoneally to the mid-line and sutured into the longitudinal line of the rectum with three stitches of linen or silk. This suture line is now covered over with a fold of peritoneum and the abdominal incision is closed.

CASE 1. Mrs. J. McD., American, age 42, mother of 3 children, 2 living, was afflicted with a prolapsus uteri of such degree that the uterus at times was entirely in the outer world. This was complicated by a rectocele and a moderate degree of a cystocele. She was operated on February 14, 1919. The hypertrophied cervix was amputated and the cystocele and rectocele were corrected, the perineum being built up high by a submucous dissection and suturing of the levator fascia. On February 22, she was operated on, mid-line incision made, abdominal viscera packed off. The technique as detailed in Technique 1 was followed. She appeared for examination again March 20, 1920. The uterus was in normal position except slightly higher in the abdomen. Apparently the uterus was drawn up somewhat by development of psoas muscle. The patient is in perfect health, has gained 30 pounds in weight, and, as she expresses it, "does not know that she has a womb." Entire absence of all pelvic reflexes. Menstruations normal. No backache, no dragging sensations and she leads a very active life. She is owner of a ranch in the country and frequently drives over rough roads back and forth to this ranch.

CASE 2. Mrs. W. L. McM., American, age 40, mother of 8 children, 6 living, afflicted with prolapsus to such a degree that she is a chronic invalid. Frequently entire uterine body in outer world. Cervix very much elongated and hypertrophied, dimension of cervix equal to that of the uterine body, and the length of cervix practically 4 inches. Operated on March 1, 1919. Cervix amputated and perineorrhaphy done. March 8, 1919, Technique 2 was employed. This patient seen latter part of February, 1920. Today she is in good health, has gained decidedly in weight, and the uterus is in normal position. No dragging sensation and no reflex symptoms are present. The first several months this patient was annoyed with drawing sensations. As she expressed it 'the sides of the pelvis were drawn together." The last 6 months this has entirely disappeared.

CASE 3. Mrs. J. W. A., age 60, mother of 6 children, badly lacerated perineum, relaxed sphincter and a prolapse of the rectum about 4 inches in length, which condition has been in existence for about 10 years. She was operated on July 7, 1919. The bowel was returned, the sphincter shortened by being dissected free, following a perineal incision around the anterior half of the anus, then a reef was taken in the sphincter on each side, the mucous membrane of the vagina was dissected free, the fascia of the right levator was brought down on the left side and stitched with linen into the reefing which had previously been made in the sphincter. A strip of levator fascia of the left side was carried across in front of the right fascia and inserted into the tucked up tissues of the sphincter on the right. This did not completely control the prolapse and so second operation was done on July 20, 1919. Technique 3 was followed in this case as outlined above for prolapsus recti. At this date, the patient has had no recurrence whatever of the extrusion of the bowel and has perfect control of her bowel. For many years she was unable to leave her home. Now she is apparently in the best of health and is able to go out on the streets.

TRANSACTIONS OF SOCIETIES

CHICAGO GYNECOLOGICAL SOCIETY

REGULAR MEETING HELD APRIL 23, 1920, DR. ARTHUR H. CURTIS, PRESIDING

UNUSUAL GROWTH IN TUBE STERILITY IN COWS

DR. N. S. HEANEY: This is a specimen from a tube removed from a case operated for procidentia. After the uterus was removed I found this small nodule in one of the tubes. It is about the size of a pea. On sectioning, it shows an epithelial, glandular structure underneath the mucosa of the tube. The cells are arranged in tubules. Some of its cells slightly resemble those of hypernephroma, while the other cells look like the collecting tubules of the kidney. I have never seen a similar specimen and have brought it here chiefly for assistance in making a diagnosis.

I have another section which I removed a week ago Sunday from a cow. Perhaps you know that sterility and abortion in dairy herds constitute a problem of great economic importance to the dairyman. A man will find that he has a pretty good herd of cattle but no calves coming along. The cows will be bred and re-bred but they do not become pregnant. The disease is said to be a sequel of what is called infective abortion, whereby cows retain the afterbirth and give birth to premature calves, and frequently subsequently fail to become pregnant.

Sterility in cows is most frequently due to an endocervicitis and the treatment instituted for it frequently relieves the sterility. It is quite similar to the condition in the human. On my farm we had ten cows that became sterile. One of these had an infantile uterus and all the findings of an infantile uterus in the human female. We dilated the cervix and bred her several times but she failed to become pregnant so we then beefed her. Another cow had a swelling of the left horn of the uterus and of the ovary, and also an endocervicitis. We dilated the cervix, painted the erosion, and she started on a course of fever, so that we thought she was going to die, but she survived this infection, although we had to beef her in six months because she remained sterile. That left 8 cows; four of these had a medium degree of endocervicitis. This was cleared up by applications of iodine and two of these cows are now pregnant. A week ago Sunday, I amputated the cervix in another one and brought this specimen tonight to show the similarity between erosion of the cow's cervix and that of the human cervix.

DISCUSSION

DR. PADDOCK: My attention was recently called to an article upon this subject and how the disease spread to other cattle. My impression is that the writer claimed that these cases get well without any treatment.

DR. HEANEY (closing): They do not all remain sterile, but I have found that a considerable percentage do.

PREGNANCY COMPLICATED BY INFLUENZA

DR. SAMUEL A. DURR discussed the subject of pregnancy and influenza (see p. 610).

DISCUSSION

DR. PADDOCK: During the influenza epidemic, pregnant women who had influenza presented a more unfavorable prognosis than the non-pregnant and justly so. It did not seem to matter much what the treatment was, a large percentage died; whether the uterus was emptied, or whether it was not, did not seem to alter the condition.

The high fever, of course, has an unfavorable effect upon the fœtus as in other diseases with high temperature. Abortion often occurred and when it did it seemed to lessen the chances of recovery of the mother.

DR. E. L. CORNELL: My experience in the last epidemic as compared with the first, as far as mortality was concerned, was this: In the last epidemic I had 5 cases of pneumonia of which 4 recovered. These have since been delivered and their babies are smaller than normal, but apparently healthy. The patient who died was first seen at 8 o'clock in the evening and she died the next morning at 4, having been up and about all the time. The other four cases were sent to the hospital and kept in bed.

In the first epidemic the mortality was very high; mine was over 60 per cent. It did not seem to me that any particular treatment made much difference.

THE TREATMENT OF ABORTION

DR. D. S. HILLIS discussed the treatment of abortion (see p. 605).

DISCUSSION

DR. WATKINS: I consider this paper a very interesting and valuable study of the subject. I was rather interested that Dr. Hillis did not speak of the cases sent into the hospital after they had been curetted. My experience has been that a great number of cases that abort are curetted, become dangerously ill, and are then sent to the hospital. Such cases are difficult to classify under the groups given. The findings which he has given are what one would expect from the various methods of treatment.

Two papers have appeared in the last few years which have thrown a great deal of light upon this subject. One was by Dr. Sampson, of Albany, which probably most of you have read. It was presented before the American Gynecological Society last year. The veins of the uterus were injected with silver after the uteri had been removed, and beautifully illustrated the blood supply of the uterus and especially the sinuses that lie immediately under the endometrium. In another class of cases where the endometrium was curetted, he showed how the sinuses are opened by the curette, which is a very strong argument against curetting in the presence of infection.

Another interesting paper which has a bearing on this subject was presented by Dr. Curtis before this society some 3 or 4 years ago. He showed that the body of the uterus generally contained no bacteria, but the body of the uterus which was removed after curettage seemed invariably to show the presence of bacteria, that is, following curettage the bacteria gain access and infect the body of the uterus.

We are indebted to one of our members for pioneer work in this subject. Dr. Ries, many years ago, protested against intra-uterine treatment of septic abortions or sepsis after labor.

Much has been said about disturbing the leucocytic wall that protects the body from extension of infection; it seems to me the thing that is very much more important is the great danger of dislodging septic thrombi in the uterine sinuses. We all know that a thrombus is one of the best culture media for the growth of bacteria, and we know if we curette, we are almost certain to dislodge them. Personally, I can see no reason why one should curette the uterus except for diagnostic purposes. Now, no man would curette a sloughing wound of the back of the hand and yet that would be very much less dangerous than curetting a sloughing wound in the uterus. The hand has a strong resistance, whereas the puerperal uterus is undergoing involution, which is almost comparable to fatty degeneration and has a low resistance to infection.

I would not take exception to anything the Doctor said except this, that in infected cases with hæmorrhage I would be very much more inclined to pack and allow the uterus to empty itself than to empty the uterus artificially. With sepsis and hæmorrhage, the uterus will empty itself very quickly if the vagina is thoroughly packed. Hæmorrhage means that the decidua or placenta is already separating from the uterine wall and the pack will hasten the separation.

I entirely agree with the Doctor about the necessity of curetting aseptic cases in certain instances. You must be sure they are well when they go home. If you do not curette, you are not certain you are sending out a cured patient.

DR. PADDOCK: I remember well that 20 years ago, Doctor Ries advocated that an aborting uterus should be left alone except in the presence of hæmorrhage. It required a great deal of courage for us to follow out his treatment. Then Professor Webster advocated packing the uterus with gauze, soaked in formalin and glycerin. All the time, however, Dr. Ries was continuing to advocate his treatment and many of us followed in his footsteps as much as we dared to.

I think this paper would be more valuable had we known something of the organisms present. I would not say that I would curette a case just to find out what organism was present. The farther I get away from curetting any case the better I I feel. I let them alone as much as possible even though there may be some discharge for several days. I think we have got to take a pretty definite stand just now, because we are going to have coming to us more women having pregnancy followed by abortion than ever before. This is probably due to the changed economic conditions.

DR. BACON: I want to call attention to one point in the nomenclature. The essayist speaks of criminal abortion and self-induced abortion. From this, one might assume that self-induced abortions are not criminal abortions. Legally, however, it makes no difference whether an abortion is made by a second party or by the patient; if it is not a therapeutic abortion, it is a criminal abortion.

I would make the same point that Dr. Paddock did about the possible value of determining the bacteriological condition of the uterus at the end of 5 days of a non-febrile state. There is not very much doubt that the uterus is contaminated even if there has been no fever at all. Where there is good drainage from the uterus, there is much less likelihood of fever being present, that is, the fever in many of these cases is simply a question of drainage. I doubt whether we would not find organisms even after 5 days' absence of fever. Then, of course, the question would come up whether a curettement at that time would not be dangerous.

I would perhaps differ slightly in the conclusions made by the author as to the importance of curettement in practically all afebrile cases. I think a day or two longer in the hospital is not of so very much importance. I understand that Dr. Hillis suggests in his conclusions that it is well to curette in these cases, because it shortens the term in the hospital.

DR. EUGENE CARY: One question which I think should be considered is that of the complications

following abortion with neisserian infection. I think in those cases one always gets a pelvic peritonitis and as a rule a tubal involvement. I think if the literature were gone over, it would be found that in all cases in which there was an active neisserian infection a pyosalpinx developed before they became well. It has been my experience that if they are treated entirely from a medical aspect, the result would be very much better. I personally would not interfere with a case like that under 6 months.

DR. C. B. REED: I was very much gratified to have the essayist so completely confirm the principles and practices which we have been carrying out in our own work.

DR. HEANEY: There are two or three points which are not clear to me in Dr. Hillis' paper. The first is, whether Dr. Hillis advocates curetting in septic abortion after a period of 5 days without fever. That is the only point in Dr. Hillis' paper with which I would take issue, that is, the safety of curetting a case as a matter of routine 5 days after being temperature-free, except for some reason as hæmorrhage. If a patient had been temperature-free for 5 days and then had a hæmorrhage, you would have to curette whether you wanted to or not. The disappearance of temperature I do not think indicates that the infection has cleared up. As Dr. Bacon says, it is a matter of drainage. The ordinary sore throat is a parallel case. You can have a bad sore throat with malaise, headache, backache, and yet have temperature only for a short period of time or no temperature at all, but inspection of the throat shows there is still infection present. With an abscess, you may have temperature and as soon as you open the abscess and establish drainage the temperature disappears. The same thing pertains to infections inside the uterus. Because you cannot see inside the uterus does not make it any different from something you can see. A tonsillar abscess may drain and the temperature disappear, although the patient still has infection. I do not think 5 days would clear it up.

I was not quite clear regarding the nomenclature. His division of cases somewhat confused me. As I understand it, those cases put in the expectant list are curetted in the event they have hæmorrhage. If they have no hæmorrhage they are kept on the non-operative treatment. The cases that are put on the operative list—I do not know whether they are all operated or not. Now there is always danger in following a rule. I think that is the greatest objection to reports including statistics. A man will follow a rule blindly. I am not quite clear whether Doctor Hillis advises that all cases coming in without temperature which have had abortions should be curetted without individualization of the case. If a case is not bleeding, should it be curetted? There is some probability that that patient has no placenta inside. There is nothing in there that will come away. If she continues to bleed, that would be different. I would not be disposed to curette every case that came into the hospital that had had an abortion, because a large percentage of those cases might already be completed. The question, then, arises, how do you determine whether a patient has a complete or an incomplete abortion? Hæmorrhage would be one of the deciding factors. Ordinarily, if a patient aborts completely, she has very little or no lochia. I would not be inclined to explore a uterus unless I had evidence from the history that the abortion was incomplete. Except as to these several points I agree with Doctor Hillis entirely.

DR. PADDOCK: May I ask the Doctor how he would treat a case of retained placenta at 4 or 5 months, or more?

DR. CURTIS: I was interested in Dr. Hillis' remark that 40 per cent had hæmorrhage. I would like to have him tell us what data he has to confirm his views. I have been very much interested in patients who are sent to the hospital after abortion. Most frequently infection is due to the spreading of bacteria which have been introduced into the uterus; the abortionist often attempts once to remove the fœtus and fails, then goes in a second time into an infected field, and thus spreads the bacteria which he previously introduced. A second type of infection results from cervical tears. We all know we have a great many bacteria in the cervix. All that is necessary for infection is an extensive tear of the cervix which permits the bacteria, which are already present, to pass through, into the extra-uterine cellular tissues.

DR. HEANEY: In cases where the patient has been bleeding for 10 days and you curette, in how many would you get nothing to account for the bleeding?

DR. DOEDERLEIN: I would like to ask a question which has not been dwelt upon; even with expert operators there are some who perforate the uterus. I saw a case in consultation a few days ago. There was a virulent peritonitis. The case would be a coroner's case if the patient died. What should the doctor do?

DR. PADDOCK: In the case cited by the essayist he says the interne did the proper thing; does he really believe that? I think in a recent conversation with him he told me he would not be afraid to leave the placenta in the uterus for any length of time. Has he looked up the literature or has he heard of similar cases where the placenta has been left in and digested? It brings us to the question of a case where we have made the diagnosis of a pregnancy at 3 months—a mistaken diagnosis, perhaps. Is it not a fact that perhaps the embryo had stopped growing and was finally digested by the uterus? This case of Dr. Hillis' may or may not have been that. The woman says she passed a piece of placenta; no one saw it but the patient. We have to doubt her statement. It may have been that the fœtus was not more than 4 or 5 months in size. She may have passed the placenta or she may not have.

I would like to know if there are any cases on record of that kind. Also, if he has since looked up the literature.

DR. CURTIS: In experiments on rabbits which I conducted some few years ago, it was very easy to get an absorption of the entire fœtus as well as of the placenta. I see no reason why that should not happen in the human.

DR. EUGENE CARY: I was called into consultation a month or two ago in a case where the fœtus had been passed, but no placenta. It was a septic case. I was asked what to do and I suggested expectant treatment. The woman remained in the hospital under the observation of a nurse, and no placenta passed. She was examined by the attending physician the other day, and the uterus is back to normal and yet not placenta has been passed.

DR. HEANEY: I might contribute some information as to the non-absorbable character of the placenta. A patient was operated upon in Vienna when 8 weeks pregnant. After the operation she aborted, but the expelled parts were thrown away. She was examined upon dismissal from the hospital, but the doctor could not say whether the uterus was large normally or had still the placenta inside. She still had some discharge but no bleeding. She traveled through Europe and finally came to the United States. In the meantime she had excessive menstrual periods, hæmorrhages at regular intervals. She finally passed the placenta, which she had carried for 3 months. I was called when she passed it. I palpated the interior of the uterus and it was empty. It is a question of considerable importance as to what should be done if the placenta does not come away immediately after birth. I have in mind a patient attended at St. Luke's Hospital by a former member of this society. The patient constantly had a low blood pressure under 100. As soon as the fœtus was delivered she went into profound collapse. The placenta did not come away. She had no hæmorrhage. The placenta remained inside for 3 days, I believe; then the doctor went in, in the absence of temperature, and removed the placenta. Then a profound sepsis developed and it was a question for some time if the patient would survive. I think if the placenta is going to be taken out, it should be taken out soon.

Inside the abdomen the placenta will develop as shown by the cases of so-called abdominal pregnancy, where the placenta is widely attached. I think under certain conditions the placenta is absorbed, but whether it is a safe thing to leave it in is a question.

DR. HILLIS (closing): I will answer Doctor Heaney first. He takes exception to the general plan which includes curetting the uterus after being 5 days' temperature free. I think he has in mind the cases of septic abortion, which have, as we all have seen, some inflammatory reaction outside the uterus. Such a case as that is not a simple, septic abortion; it has some complications. According to our experience with this series of cases, in the ordinary case that comes into the hospital with a temperature of 101° or 102° and runs such a temperature for a week, if it were curetted in the middle of this temperature the patient would most certainly become septic. When the temperature goes down to normal, and if the patient remains temperature free for 5 days, then it is safe to curette. Now the Doctor makes the comparison between the uterus and the throat; I have never curetted any throats but I have curetted a number of cases of this kind 5 days after the fever had gone and none of them showed any temperature reaction.

The non-operative cases on the operative list were, as Dr. Heaney suggests, cases where nobody would have the scientific enthusiasm to curette: cases with a small amount of lochia, disappearing to a vanishing point within 3 days. If the case had not been curetted by that time, it would be left alone. Some of these cases have to be curetted and others not; in other words, we individualize the cases.

In answer to Dr. Watkins' question regarding packing the uterus to stop severe bleeding, it may be that there is less trauma connected with packing than there is with curetting. In some cases I think it is the better plan. However, there is considerable doubt in my mind as to which method would involve less trauma to the uterus.

Regarding the bacteria found, this question is in such a state of chaos, I shall do nothing more than to refer to it. There is a plan under way now at the County Hospital to make a bacteriological study of these cases of abortion.

That answers Dr. Paddock's question regarding bacteria. As far as his question in regard to a four months' pregnancy is concerned, 8 weeks ago a patient came into the ward with an extremely decompensated heart. She was in such a bad condition that we immediately put in a bag and emptied the uterus; she was 6 months pregnant. The fœtus was expelled. Because of the condition of the heart the bag had to be put in, with the patient in the sitting position. When the fœtus was expelled the placenta did not come down. I pulled down the cord, cut it off, and allowed it to retract, and put the patient back to bed. That was exactly the thing I should not have done. I was able to keep her from being curetted for 6 weeks. At the end of 6 weeks the question was whether or not she could go home. One day she had a temperature of 100° on three observations. At the end of 6 weeks, the uterus was the size one would expect after emptying it. She had no lochia for 3 weeks. She went home. Seven weeks after the abortion she called me and said she was menstruating. She menstruated for about a week and is enjoying very good health. I made a particular investigation of this case and talked to the nurse who had it in charge, and found that one piece of placenta as big as a thumb had been passed. This the nurse showed to the interne, who said it was placenta. The patient also stated that she passed two other pieces of this kind; but

that was all the placenta that was passed. She had no bleeding, nothing to interfere with her convalescence.

Dr. Curtis wants to know what persistent bleeding means. Some of these cases come in with the uterus practically empty; in others, it is not quite empty. When a patient bleeds for more than 6 days in the hospital, we regard that she has gone over time and we consider the uterus empty. We consider that the persistence of lochia over 6 days is an indication for curettage.

In answer to Dr. Heaney, in quite a few of these cases we find nothing to account for the bleeding.

Dr. Cary mentioned the question of neisserian infection. I would say it is a rather safe procedure to curette a patient in the presence of a neisserian infection that cannot be diagnosed, but still may be present somewhere in the uterovaginal tract.

As far as Dr. Doederlein's case is concerned, I should be inclined to treat the peritonitis and not the septic abortion. I think it would not help matters in such a case to go inside of the uterus. I have in mind one case where the patient went to an abortionist, who infected the uterus. First she had tenderness and temperature reaction. Then she came to the County Hospital, where she was put to bed until the temperature subsided. We believed it was an infection of the cervix because the abortionist did not succeed in completely bringing about the abortion.

In regard to Dr. Paddock's objection to the size of the placenta, the patient saw two pieces and the interne one.

I have almost reached the conclusion that spontaneous abortions if left alone will never be the cause of a serious infection. I believe a placenta left in the uterus will not cause an infection that is serious. Polak, of Brooklyn, leaves the placenta in for several days if necessary. I am not familiar with the details of his procedure. I do not know that he had cases where it was left in indefinitely. Williams had a case where he left in a full term placenta and never found it. I am coming to the opinion that it would be safe to leave a clean placenta in the uterus indefinitely.

CORRESPONDENCE

PERTROCHANTERIC FRACTURE OF THE FEMUR

To the Editor: In following up cases of fracture of the upper end of the femur treated during the past 20 years at the surgical clinic of the University of Amsterdam, I came across such a striking example of pertrochanteric fracture of the femur, a condition so well described by Dr. Abraham O. Wilensky in an article on that subject in the March, 1920, issue of SURGERY, GYNECOLOGY AND OBSTETRICS, that I deem the case worthy of publication.

On December 16, 1912, Mrs. G. S., age 68, while intoxicated, fell downstairs, and injured both lower extremities. She was taken to the hospital. On entrance her pulse was scarcely perceptible (50), and she complained of pain in the head and legs. After a time the pulse improved, although the rate was but 46. The next day the pulse rate was 90 and remained at this point without alteration.

Examination showed a hæmatoma above and back of the left ear. The pupils were unequal, the left somewhat larger than the right. Reaction to light and accommodation was normal. The left leg was held in outward rotation, and there was a swelling in the iliac region extending to the knee-joint, the greatest swelling being just below the hip. At some distance beneath the crest of the ilium could be felt a bone-point beneath the skin. Pressure in the region of the neck of the femur was very painful. Slight rotation produced crepitation. A roentgenogram showed an intertrochanteric fracture with the shaft of the femur dislocated forward, the upper fragment turned upward.

Both extremities were placed in extension, in adhesive plaster bandages. Convalescence was complicated by sloughing and pneumonia. On February 3, traction was discontinued. On March 18, the patient was given her first walking exercises. On April 24, she was dismissed from the hospital, at which time she walked fairly well although with some stiffness of both hips, more marked on left side.

On April 7, 1920, the patient returned on request. At this time the gait was almost normal but the patient complained of pain in the left hip. Examination showed all joints perfectly movable. It could not be determined whether or not shortening had taken place as both femurs had been broken. A roentgenogram showed the dislocation to be insufficiently corrected.

DR. W. F. WASSINK.
Amsterdam, Holland.

BOOK REVIEWS

A CRITIQUE OF NEW BOOKS IN GYNECOLOGY AND OBSTETRICS

By GEORGE GELLHORN, M.D., F.A.C.S., St. Louis

A NUMBER of foreign works on obstetrics and gynecology have arrived on the reviewer's desk during the summer vacation. Of these, a large monograph written by Winter[1] in collaboration with several of his pupils deserves first mention. In these days when the steadily decreasing birth-rate is a matter of concern to all thoughtful observers and when the problem of repopulating a devastated world looms up as a gigantic task, the old question of artificial abortion assumes a new and even more urgent significance. It is plainly the duty of all obstetricians to see to it that thousands of potential lives are not sacrificed unnecessarily in addition to the millions that were lost in the war. This, then, is the time to take stock, as it were, of the present status of this subject, to gather in all available data, to utilize the results of scientific investigations and practical experience, and to formulate clearly and precisely the indications upon which a pregnancy may be interrupted prematurely. Which one of us has not sadly felt at times the need of such a comprehensive guidance—whether as teacher when he wanted to give his students an up-to-date instruction as to the proper course to pursue, or as practitioner when he could find in his textbooks only brief and generalized directions which could not possibly do full justice to the particular case he had in charge. To supply this want in our literature, to help the physician decide on a justifiable interruption of pregnancy, this is the aim of Winter's book. In the opening chapter which contains a general definition of indications, we learn that social and eugenic factors are completely eliminated and that solely medical principles must determine our actions. Pregnancy may produce or aggravate serious diseases. These, as a rule, are subject to internistic treatment, and only if the latter fails, is abortion permissible as a last resort. The foundation of such an indication rests, first, upon the scientific recognition of a causal relationship between pregnancy and complicating disease, and second, upon the practical experience of the salutary effect of the artificial abortion. This viewpoint guides Winter and his co-authors in the following discussion which deals in great detail with all complicating diseases thus far observed in pregnancy. Winter's conservatism is generally known. It is strongly reflected in his latest work. Whether the toxæmias of pregnancy, respiratory, cardiac and renal diseases, or disorders of metabolism and of internal secretion are under discussion, or whether affections of the nervous and genital systems, or any other ills are considered—the predominant note is always one of caution not to draw hasty deductions; and a very large personal experience, the records of his university institution, and all the available literature are invoked to arrive at the final conclusion. To give a few illustrations, Winter shares the general attitude toward tuberculosis of the lungs and larynx. In heart disease, too, the generally accepted therapy prevails in Koenigsberg. Chronic nephritis, in itself, is no indication for abortion unless previous internistic treatment has failed. Exophthalmic goiter demands a medical therapy and, in case of its uselessness, a strumectomy; abortion is indicated only in extremely few cases. In osteomalacia, contrary to former views, interruption of pregnancy is not justifiable; rather should medical treatment or castration, even during pregnancy, be considered. The chapter on psychoses which has been written by E. Meyer, professor of psychiatry, contains most valuable hints how to evaluate manic depressions in pregnancy. Pernicious anæmia demands immediate interruption of gestation. Oteosclerosis, on the other hand, furnishes no such indication, even though this ear disease is frequently made worse by pregnancy.

From the foregoing rather cursory survey it must appear that this work of Winter is a most valuable addition to our literature, and that, even without sharing in all points the extreme conservatism of its tenor, it is indispensable to the specialist as well as to the practitioner.

THE reviewer has devoted a considerable amount of space to this book not only because of its intrinsic worth but also because monographs of just this kind are perhaps the most eloquent arguments in favor of the vigor and vitality of our specialty—an assurance of which some timid souls seem to be in need at times. Unfortunately, the same unequivocal commendation can not be given to the monograph on the exact diagnosis of latent cancer by O. C. Gruner, of Leeds[2]. The title, indeed,

[1] Die Indikationen zur kuenstlichen Unterbrechung der Schwangerschaft. By Prof. Dr. G. Winter und seinen Schuelern Prof. Sachs, Dr. Benthin, Dr. Sachse, Dr. Kunkel, Dr. Blohmcke. nebst. einem Beitrag von Prof. Dr. E. Meyer. Berlin and Vienna: Urban and Schwarzenberg, 1918.

[2] The Exact Diagnosis of Latent Cancer. By O. C. Gruner, M.D. Philadelphia: Blakiston's Son & Co., 1919.

is most alluring, and every surgeon and gynecologist would be only too happy to know if his patient is really free from disease after an apparently successful operation. The author claims that he can give the answer from a close study of the blood and he believes that by this means he can even arrive at an exact diagnosis of precancerous conditions. We find, therefore, in this book an intense study of hæmatology where the minute changes in the morphology and chemism of the constituents of the blood are carefully noted. The final outcome is a mathematical formula which bears a suspicious resemblance to the binomial theorem and awakens uneasy recollections of sleepless nights in college. Here, however, the mathematical precision seems to end; for if in the process of arriving at a diagnosis of latent cancer, it is still further demanded that the character of the patient, his social conditions, the exact quantities of each article on his menu and the details of modes of cooking, and, finally, the prevailing meteorological conditions be taken into consideration, then we feel with a sigh, that, the good intentions of the writer to the contrary, we are as yet removed from the idealistic object of this dissertation.

WE stand on more familiar ground when we read Cotret's[1] monograph on the normal and pathological puerperium, which forms a part of his lectures at the French-Canadian University of Montreal. The shorter first part of the book deals with the anatomical, histological, and physiological phenomena, the diagnosis and the hygiene of the puerperal state, while the rest of the work treats of the pathology of the puerperium. Pathology, in this connection, means to the author exclusively the various forms and localizations of infection, while not a word is said about birth injuries and their repair, hæmorrhages, subinvolution, inversion, and other abnormal conditions which we are accustomed to include in a discussion of the puerperium. Another unusual feature is the total absence of illustrations without which we nowadays can hardly conceive of a book designed for medical students.

Aside from these few points of incompleteness, however, the author has produced a very readable book which is of particular interest to us, as it naturally emphasizes certain measures typical of the French School which, at best, are only briefly mentioned in our own textbooks. Thus we find among the methods of cleansing the uterine cavity the use of *écouvillonage* by means of a sort of test tube brushes, and among the means of combating puerperal infection that of "fixation abscess." For the latter he claims great prognostic value. The infection seems arrested by formation of such an abscess, and "if employed quickly, this method is almost synonymous with cure." Serum and vaccine therapy are to him of very doubtful importance. In general or localized peritonitis, operation is the method of choice as soon as the diagnosis is made. In acute cases from 50 to 100 per cent cures will thereby be accomplished whereas medical treatment results in a mortality of from 85 to 100 per cent. Vaginal douches are employed by him more extensively than is the custom with us, and in general, the book offers a very interesting comparison of the methods in vogue in France and in America.

IN re-editing Herman's classical book on difficult labor,[2] Oldfield deserves general approbation. This book, which since the first edition in 1804 has been a most valuable companion at the bedside to generations of English obstetricians, now appears for the sixth time, essentially in its original form, and only altered to include recent advances in obstetrics. Cæsarean section, for instance, is to be done more frequently in contracted pelvis, and also in antepartum hæmorrhage. The incision recommended is a moderately high one. In infected cases, the low incision should not be made because of the nearness of the cervix and vagina where pathogenic organisms are more likely to be found than in the uterine cavity. This position is at variance with the standpoint of most American and German operators. The use of continuous Carrel-Dakin irrigation in incomplete, or after operation for complete, rupture of the uterus is another addition to the original. On the other hand, there are numerous reminiscences of older days. Thus, ergot, is still recommended in primary inertia, and even the *vectis*, that historical instrument of which we epigoni hardly know the name, finds its time-honored niche.

But, after all, this is not a very serious drawback, and the book, in its new form, will certainly maintain its former reputation.

OF the *Gynæcology* by Eden and Lockyer[3] it need only be said that it easily ranks among the very best works on that subject in the English language. It is a truly excellent book which satisfies every demand not only as to text but also as to illustrations.

A few additions have been made to bring the work up to date. We may well repeat, what we said at the first appearance of the book[4]: "The authors have succeeded in keeping the instruction abreast of the most modern advance in our knowledge and in maintaining an even balance between the pathology and clinical aspects of the work . . . The attractions and distinct advantages of this book are so numerous that it will easily obtain citizenship on this side of the ocean."

[1] SUITES DE COUCHES NORMALES ET PATHOLOGIQUES. By E. A. Réné de Cotret. Montreal: La Cie d' Imprimerie Godin, 1919.

[2] HERMAN'S DIFFICULT LABOUR. A guide for students and practitioners. 6th ed., revised and enlarged. By Carlton Oldfield, M.D., F.R.C.S. London, New York, Toronto and Melbourne: Cassell & Co., Ltd. 1920.

[3] GYNÆCOLOGY, for students and practitioners. By Thomas Watts Eden, M.D., F.R.C.S., F.R.C.P. Major R.A.M.C.) and Cuthbert Lockyer, M.D., B.S., F.R.C.S., F.R.C.P. 2d. ed. New York: The Macmillan Company, 1920.

[4] SURG., GYNEC. & OBST., 1917, xxiv, 753.

ANOTHER valuable English book that has appeared in its second edition, is that by Berkeley and Bonney[1]. It intends to guide the practitioner through the intricacies of applying the knowledge gained in medical school, and we find that the authors have solved their task admirably well. The book is divided into five parts which deal, respectively, with the examination of the patient, the significance of symptoms, the interpretation of physical signs, treatment, and medicolegal aspects of gynecology. Where there is so much that is of superior quality, it is hardly necessary to mention any details; but we can not refrain from pointing specifically to the instructions for conducting a bimanual examination, to the excellent illustrations of palpatory findings, to the very lucid differential diagnosis of fibroids, and to the splendid manner in which the significance of symptoms is brought home to the reader. We are so favorably impressed that we are willing to overlook certain liberties taken with Latin terms, as in the term ovulæ Nabothi.

Here and there we feel inclined to put a question mark after statements such as this, that the use of the vaginal speculum for examination is needed only by the beginner. In other places, more particularly in the therapeutic part, we would wish for a greater variety of methods. For the replacement of the retroflexed uterus, for instance, where they justly reject the sound, the authors rely on a very cumbersome digital reduction and seem to be unaware of the far more preferable method of Kuestner. In the palliative treatment of uterine cancer, douches are their first choice which to most of us would seem a rather thankless task. They admit the efficacy of acetone but ascribe much pain to its application; which, if the reviewer may be permitted to speak *pro domo*, proves that their technique is faulty.

And yet, with all these criticisms which may, perhaps, have an effect upon a later edition, this book is very good and will be most welcome alike to teachers and to practitioners.

[1] A GUIDE TO GYNÆCOLOGY IN GENERAL PRACTICE. By Comyns Berkeley, M.A., M.D., M.C. (Cantab.), F.R.C.P. (Lond.), M.R.C.S. (Eng.); and Victor Bonney, M.S., M.D., B.Sc., (Lond.), F.R.C.S., (Eng.), M.R.C.P. (Lond.).2d ed. London: Oxford University Press, 1919.

THE same authors have re-edited their *Textbook of Gynecological Surgery*[2], a companion piece to the foregoing work. The clearness of diction is the same that distinguishes the book reviewed above, and there is no fault to find with the printed description of operations which is preceded by a very good synopsis of the indications and followed by a thorough consideration of particular difficulties likely to be encountered, complications, after-care, etc. Yet, as a whole, the book is less satisfying. The chief reason is probably the quality of the illustrations. These, though numerous enough, are all small pen drawings and for the most part insufficient to serve their purpose. An experienced gynecologist might be enabled by their help to carry out the methods of the authors, but the book is more specially written for "those who are occasionally called upon to perform gynecological operations, and have not had opportunity for acquiring the ripe experience which long apprenticeship in the gynecological wards and operating theater brings." This inadequacy of the illustrations is, perhaps, most obvious in plastic work and it is even more evident in radical abdominal hysterectomy of cancer where one, by contrast, is reminded of the magnificent pictures of Kroenig and Doederlein, Sigwart, Hirst, Graves, and others. It may, however, be remarked in this connection that the final results of operation for uterine cancer are exceptionally good, and that the surgical accomplishments of the authors at no time can be questioned.

As the book is a record of the personal methods of the authors and reflects the practice of the school of gynecological surgery to which they belong, we must not take issue with, but merely mention, certain points of divergence from our own customs. To these belong the use of silk within the abdominal cavity, the repair of a third degree laceration with a single continuous suture the knots of which extend into the bowel, the failure of fastening the round ligaments to the stump of the vagina after hysterectomy, etc. Be that as it may, as a personal record, the work confers credit upon the Middlesex and Chelsea Hospitals whence it emanated.

[2] A TEXTBOOK OF GYNÆCOLOGICAL SURGERY. By Comyns Berkeley, M.A., M.D., M.C. (Cantab.), F.R.C.P. (Lond.). M.R.C.S. (Eng.); and Victor Bonney, M.S., M.D., B.Sc. (Lond.), F.R.C.S. (Eng.), M.R.C.P. (Lond.). 2d. ed. London: Cassell & Co., 1920.

AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY

No one could be more interested in the appearance of the *American Journal of Obstetrics and Gynecology* than the editor of SURGERY, GYNECOLOGY AND OBSTETRICS. It was with great regret that we saw the old *American Journal of Obstetrics* retire from the field and leave the obstetricians and the gynecologists of America without an exclusive journal.

Volume 1, Number 1, of the *American Journal of Obstetrics and Gynecology* with its strong editorial board, its splendid appearance typographically, and its valuable scientific material, encourages one to believe that the old blue journal, that did so much for the development of the science of gynecology and obstetrics in America, has a worthy and permanent successor.

The obstetricians, the gynecologists, the general practitioners, the medical journalists of America, and the publishers of this important journal are to be congratulated in having at the

head of the editorial board, Dr. George W. Kosmak, and as associate editor, Dr. Hugo Ehrenfest.

Nothing can demonstrate the worth of this first number to greater advantage than the presentation of its table of contents:

ORIGINAL COMMUNICATIONS

A Program for American Gynecology. Presidential Address. American Gynecological Society. By Robert L. Dickinson, M.D., F.A.C.S., New York City.

A Demonstration of Certain Transition Stages from Benign to Malignant Conditions in the Ovary, the Uterus, and the Vulva. By T. Watts Eden, M.D., F.R.C.P., F.R.C.S., and Gordon Ley, F.R.C.S., London, England.

The Induction of Labor at Term. By Charles B. Reed, M.D., F.A.C.S., Chicago.

The Prophylactic Forceps Operation. By Joseph B. DeLee, M.D., F.A.C.S., Chicago.

Extraperitoneal Cesarean Section. By John A. McGlinn, M.D., M.S., Philadelphia.

Cranial and Intracranial Birth Injuries. By Harold Bailey, M.D., F.A.C.S., New York City.

SOCIETY TRANSACTIONS

American Gynecological Society. Forty-fifth Annual Meeting.

Analgesia and Anesthesia in Labor. By Edward P. Davis, M.D., F.A.C.S., Philadelphia.

Induction of Labor; Indications and Methods, with Special Reference to the Use of Pituitary Extract. By Benjamin P. Watson, M.D., F.A.C.S., Toronto, Ont.

Induction of Labor at Term. By Charles B. Reed, M.D., F.A.C.S., Chicago.

The Prophylactic Forceps Operation. By Joseph B. DeLee, M.D., F.A.C.S., Chicago.

The Value of the Wassermann Reaction in Obstetrics Based upon the Study of 4547 Consecutive Observations. By J. Whitridge Williams, M.D., F.A.C.S., Baltimore.

Extraperitoneal Cesarean Section. By John A. McGlinn, M.D., F.A.C.S., Philadelphia.

Recent Progress in Obstetrics and Gynecology. By Hugo Ehrenfest, M.D., F.A.C.S., St. Louis.

The Treatment of Suppurating Wounds Following Abdominal Section. By Thomas J. Watkins, M.D., F.A.C.S., Chicago.

Acidosis in Operative Surgery and Its Treatment by Glucose and Gum Acacia Given Intravenously. By Lilian K. P. Farrar, M.D., F.A.C.S., New York City.

Transition Stages from Benign to Malignant Conditions in the Ovary, the Tubes, and the Vulva. By Thomas Watts Eden, M.D., F.R.C.P., F.R.C.S., London, England.

DEPARTMENT OF REVIEWS AND ABSTRACTS

Collective Review—The Prophylaxis and Treatment of Puerperal Infections. By Hugo Ehrenfest, M.D., F.A.C.S.

Selected Abstracts—The Bacteriology and Chemistry of the Vagina.

BOOKS RECEIVED

Books received are acknowledged in this department and such acknowledgment must be regarded as a sufficient return for the courtesy of the sender. Selections will be made for review in the interests of our readers and as space permits.

CHIRURGIE RÉPARATRICE ET ORTHOPÉDIQUE. Edited by E. Jeanbrau, P. Nové-Josserand, L. Ombrédanne, P. Desfosses. 2 vols. Paris: Masson et Cie., 1920.

LAS AMPUTACIONES CINEPLÁSTICAS. By Dr. Guillermo Bosch Arana. Buenos Aires, 1920.

TUMOURS COMPLICATING PREGNANCY, LABOUR, AND THE PUERPERIUM. Being the Lettsomian Lectures delivered before the Medical Society of London, February and March, 1920. London: Harrison & Sons, 1920.

A HANDBOOK OF MIDWIFERY; for midwives, maternity nurses, and obstetric dressers. By Comyns Berkeley, M.A., M.C., M.D. (Cantab.), M.R.C.S. (Eng.). 5th ed., enlarged. London, New York, Toronto, and Melbourne: Cassell & Co., Ltd.

CLÍNICA QUIRÚRGICA Y TÉCNICA OPERATORIA. By Dr. J. A. Presno y Bastiony. Havana, 1920.

THE AMERICAN RED CROSS IN THE GREAT WAR. By Henry P. Davison, Chairman of the War Council of the American Red Cross. New York: The Macmillan Company, 1920.

TRÁTADO PRÁCTICO DE RADIOLOGÍA. By Dr. Carlos Heuser. Buenos Aires: 1920.

OPERATIVE GYNECOLOGY. By Harry Sturgeon Crossen, M.D., F.A.C.S. 2d ed. St. Louis: C. V. Mosby Company, 1920.

MASSAGE AND EXERCISES COMBINED; a Permanent Physical Culture Course for Men, Women, and Children. By Albrecht Jensen. New York: 1920.

PHYSIOLOGY AND BIOCHEMISTRY IN MODERN MEDICINE. By J. J. R. Macleod, M.B., assisted by Roy G. Pearce, A. C. Redfield, and N. B. Taylor, and by others. 3d ed. St. Louis: C. V. Mosby Co., 1920.

MATERNITAS; a book concerning the care of the prospective mother and her child. By Charles E. Paddock, M.D. Chicago: Cloyd J. Head & Co., 1920.

DIE BEHANDLUNG DER HAUT- UND GESCHLECHTSKRANKHEITEN. By Dr. Erich Hoffmann. Bonn: A. Marcus E. Webers Verlag, 1920.

LEITFADEN DER KINDERHEILKUNDE FUER STUDIERENDE UND AERZTE. By Dr. Walter Birk. Vol. II—Kinderkrankheiten. Bonn: A. Marcus E. Webers Verlag, 1920.

AMERICAN COLLEGE OF SURGEONS

HOSPITAL STANDARDIZATION

THE chief purpose of the American College of Surgeons, since its beginning in 1913, has been the betterment of the clinical practice of surgery. Surgery is a specialty of medicine; it is also an inseparable part of the science of medicine. Better practice of surgery, therefore, means the better practice of medicine, and it was with this fundamental idea that the College set about its work. Even matters of public health, the prevention of disease, the intelligent distribution of the benefits of medicine, medical education, and problems of hospital administration and equipment, are factors in any comprehensive plan of action with such an aim. The work of the College in these fields is called hospital standardization.

Details of the program of hospital standardization, what it is, how it developed, its meaning to the public, to the hospitals, and to the profession, and a bibliography of the subject, are given in the report of the College for 1919 (Bulletin Vol. IV, No. 4). The following pages are a report of progress for 1920.

Hospital standardization aims to safeguard the patient against error in diagnosis, against lax or lazy treatment, against unnecessary surgical operations or operations by unskilled surgeons; it aims to bring to every patient, however humble, the highest service known to the profession.

Backed by the common experience of practice, doctors today unanimously agree that if they are to create the highest service of which the profession is capable, they must at regular intervals review what they have done, what results they have accomplished, what mistakes, if any, they have made and why. No avoidable mistake should be repeated. In other words, it is the doctor's obligation to benefit constantly by his experience and to apply to his work the ever increasing wisdom gained from that experience. Further, the doctor's duty to his profession, to himself, and to society, requires that he benefit also by the clinical experience of his colleagues. The common experience of his colleagues is his and his experience is theirs.

But how is the doctor to gain in a regular and orderly way the benefit of his own and his colleagues' clinical experience? To answer that question the minimum standard, given below, was designed.

The minimum standard grew gradually out of a thorough study of actual conditions in the practice of medicine. It grew out of the straight thinking of the clearest minds in medical and hospital work on this continent. It is practicable, workable, and constructive. It costs effort rather than money. It safeguards the care of every patient admitted to the hospital by insistence upon competence on the part of the doctor, on thorough study and diagnoses in writing for each case, and a checking up, at least once each month, of the clinical service of the hospital. It fixes responsibility throughout the hospital. It calls for the "production sheets" of the hospital, but does not cause in any way violation of the confidential relationship between the doctor and his patient. It encourages and even compels research. It defines the minimum service to the patient, which, beyond all debate, is considered essential.

Above all, the minimum standard is designed to bring a sense of responsibility to those who have to do with a hospital, that each patient admitted shall receive care scientifically sound. It is on this basis that the hospital may seek the confidence, good will, and support of its community.

The medical superintendent[1] of one of the leading hospitals of the continent recently said, after years of practical administration of the standard:

"The minimum standard is not, perhaps, so simple as it looks. But certainly it does not impose too great a burden of effort upon the doctor or upon the hospital. It calls for no undue expenditure of money. It is not impertinent, for it is based upon the sound principles of practice which the profession long ago accepted. It forces a constructive and co-operative scrutiny over all medical work in the hospital; unnecessary surgery, incompetent surgery, lax and lazy medical service, and all commercialism in medicine go down before it.

"The minimum standard is not a theory. Wherever it is tried with sincerity, it succeeds.

[1] Dr. M. T. McEachern, Vancouver General Hospital.

One result of it, too, is that it swiftly submerges personal prejudices among doctors and unites them under those bonds which have always made the profession great."

Again, the *World's Work* last spring assigned to an investigator the task of making a report upon the effect of the minimum standard among hospitals. This report was published in the magazine for June, 1920. With regard to the minimum standard, the writer, Mr. Hawthorne Daniel, says in part:

"The statement is simplicity itself, and yet, with all of its simplicity it contains just the suggestions that go to make good hospitals of mediocre ones; just the suggestions that lead to the conservation of lives and the elimination of unnecessary operations; just the suggestions that bring about the conscientious care that every patient in every hospital has a right to expect.

"From coast to coast the idea is changing the conditions in hospitals. Everywhere there is the ferment of development, the activity of improvement. In great centers of medical affairs the changes have been startling. In Baltimore, the greatest center of medicine in America, there is not a hospital of 100 beds or more that has not put into effective operation the minimum standard.

"In New York and other cities the hospitals have made almost as great an advance. The world of the hospital is changing. An advance normally to be expected in twenty years has come in three. For this opinion I am indebted to President Henry S. Pritchett of the Carnegie Foundation.

"The medical profession generally is to be congratulated upon the progressive work being accomplished by its many prominent members who are Fellows of the American College of Surgeons. In its membership the College includes the best men in the field, and there are few prominent surgeons in the country who are not on its roll.

"The medical profession is largely made up of men who are practical idealists. Sometimes, under the forces of circumstances, some of them may not have held entirely true to their own ideals, but it seems difficult to believe that many of them have ever allowed their ideals completely to lose control. And with the program of the College to supplement their own beliefs they are throwing aside those methods that are open in the least to criticism, and of their own volition have renewed and increased their efforts to bring about the reforms in which they always have believed.

"It is with this elusive force that the College has worked with such success. With the ideals of the profession visualized, and with practical plans made to insure their application, the country may confidently look forward to a new era that is already partly here; when the hospitals of America will be institutions for service, from which selfish interest and careless methods have been abolished, and to which the country may look for considerate and efficient treatment, confidently expecting and receiving the utmost that the medical profession is capable of giving."

THE MINIMUM STANDARD

The standard provides:

1. That physicians and surgeons privileged to practice in the hospital be organized as a definite group or staff. Such organization has nothing to do with the question as to whether the hospital is "open" or "closed," nor need it affect the various existing types of staff organization. The word *staff* is here defined as the group of doctors who practice in the hospital inclusive of all groups such as the "regular staff," the "visiting staff," and the "associate staff."

2. That membership upon the staff be restricted to physicians and surgeons who are (a) competent in their respective fields and (b) worthy in character and in matters of professional ethics; that in this latter connection the practice of the division of fees, under any guise whatever, be prohibited.

3. That the staff initiate and, with the approval of the governing board of the hospital, adopt rules, regulations, and policies governing the professional work of the hospital; that these rules, regulations, and policies specifically provide:

(a) That staff meetings be held at least once each month. (In large hospitals the departments may choose to meet separately.)

(b) That the staff review and analyze at regular intervals the clinical experience of the staff in the various departments of the hospital, such as medicine, surgery, and obstetrics; the clinical records of patients, free and pay, to be the basis for such review and analyses.

4. That accurate and complete case records be written for all patients and filed in the hospital, a complete case record being one, except in an emergency, which includes the personal history; the physical examination, with clinical, pathological, and X-Ray findings when indicated; the working diagnosis; the treatment, medical and surgical; the medical progress; the condition on discharge with final diagnosis; and, in case of death, the autopsy findings when available.

5. That clinical laboratory facilities be available for the study, diagnoses, and treatment of

patients, these facilities to include at least chemical, bacteriological, serological, histological, radiographic, and fluoroscopic service in charge of trained technicians.

THE "APPROVED" LIST

Following herewith is a list of the general hospitals of one hundred or more beds in the United States and Canada which on inspection either met the minimum standard or later during the current year reported that they meet that standard.

In presenting this list the Regents of the College are quite aware that artificial standardization is indefensible. After five years of work, however, upon the problem of better service in hospitals, the Regents believe that the standard upon whch this list is based is fundamental. They are borne out in this view by the hospital administrators and hospital trustees. The list, therefore, marks in an accurate fashion the progress of the medical profession in making its own ideals come true in practice.

The hospitals named in the list are taken from a group of 671 hospitals. Two years ago 89 out of these 671 hospitals fulfilled the minimum standard; one year ago 198 out of the 671 met the standard; at the present time 392 of the group meet the standard.

These figures are the findings of personal visits to the hospitals by staff members of the College. These men, all graduates in medicine, visited the hospitals not as spies nor as meddlers. They went rather as engineers, discovering first what the shortcomings of the institutions were and then indicating how those shortcomings might best be overcome. The council meetings held at the various hospitals by these visitors are a most important factor in the success of the entire work.

In addition to the 695 general hospitals of 100 or more beds in the United States and Canada, there are in these two countries 979 general hospitals of from 50 to 100 beds.

On every hand evidence exists today of a new and powerful interest on the part of the public in hospitals. The time is not far distant when a hospital, in co-operation with the doctors who practice in it, must either soundly protect the patients' right to be well or forfeit all claim to the confidence and good will of the community.

HOSPITALS WITH A CAPACITY OF 100 OR MORE BEDS IN WHICH THE MINIMUM STANDARD IS IN EFFECTIVE OPERATION

Those marked (*) were deficient in one or more details at the time of inspection but later reported complete fulfillment of Standard.

UNITED STATES

ALABAMA

Employes Hospital T. C. I. & R. R. Co., Birmingham
*Hillman Hospital, Birmingham
*South Highlands Infirmary, Birmingham

ARKANSAS

*Logan H. Roots Memorial Hospital, Little Rock
*St. Louis Southwestern Hospital, Texarkana
*St. Vincent's Hospital, Little Rock

CALIFORNIA

Alameda County Hospital, San Leandro
Lane Hospital, San Francisco
Los Angeles County Hospital, Los Angeles
*Mary's Help Hospital, San Francisco
*O'Connor Sanitarium, San Jose
*Pasadena Hospital, Pasadena
*St. Francis Hospital, San Francisco
*St. Mary's Hospital, San Francisco
St. Vincent's Hospital, Los Angeles
*San Diego County Hospital, San Diego
San Francisco Hospital, San Francisco
*San Joaquin County Hospital, French Camp
*Santa Clara County Hospital, San Jose
University of California Hospital, San Francisco

COLORADO

*City and County Hospital, Denver
Minnequa Hospital, Pueblo
*St. Anthony's Hospital, Denver

CONNECTICUT

*Bridgeport Hospital, Bridgeport
Grace Hospital, New Haven
Greenwich General Hospital, Greenwich
*Hartford Hospital, Hartford
New Haven Hospital, New Haven
St. Francis Hospital, Hartford
*St. Mary's Hospital, Waterbury
Waterbury Hospital, Waterbury

DISTRICT OF COLUMBIA

*Central Dispensary and Emergency Hospital, Washington
*Garfield Memorial Hospital, Washington
*George Washington University Hospital, Washington
*Washington Sanitarium, Washington

GEORGIA

*Grady Memorial Hospital, Atlanta
*University Hospital, Augusta

IDAHO

*St. Alphonsus Hospital, Boise

ILLINOIS

*American Hospital, Chicago
Augustana Hospital, Chicago
Chicago Lying-in Hospital, Chicago
Children's Memorial Hospital, Chicago
Cook County Hospital, Chicago
Evanston Hospital, Evanston
*Frances E. Willard National Temperance Hospital, Chicago
*Grant Hospital, Chicago
Hahnemann Hospital, Chicago
*Illinois Central Hospital, Chicago
Mercy Hospital, Chicago
Michael Reese Hospital, Chicago
Presbyterian Hospital, Chicago
St. Anne's Hospital, Chicago
*St. Bernard's Hospital, Chicago
*St. Elizabeth's Hospital, Chicago
*St. Elizabeth's Hospital, Danville
St. Joseph's Hospital, Chicago
St. Luke's Hospital, Chicago
St. Mary of Nazareth Hospital, Chicago
*South Shore Hospital, Chicago
Wesley Memorial Hospital, Chicago

INDIANA

*Methodist Episcopal Hospital, Indianapolis
Robert W. Long Hospital, Indianapolis
*St. Anthony's Hospital, Terre Haute
St. Elizabeth's Hospital, La Fayette
St. Joseph's Hospital, Fort Wayne
*St. Joseph's Hospital, Mishawaka
*St. Mary's Hospital, Evansville

IOWA

*Iowa Lutheran Hospital, Des Moines
*Mercy Hospital, Davenport
St. Joseph's Mercy Hospital, Sioux City
University Hospital, Iowa City

KANSAS

*St. Francis Hospital, Wichita
St. Margaret's Hospital, Kansas City

KENTUCKY

*Good Samaritan Hospital, Lexington
*Norton Memorial Hospital, Louisville
Louisville City Hospital, Louisville
*St. Anthony's Hospital, Louisville
*St. Joseph's Infirmary, Louisville
*SS. Mary and Elizabeth Hospital, Louisville

LOUISIANA

*Charity Hospital, New Orleans
*Charity Hospital, Shreveport
*Hotel Dieu Hospital, New Orleans
*Presbyterian Hospital, New Orleans
*St. Francis Sanitarium, Monroe
*T. E. Schumpert Memorial Sanitarium, Shreveport
*Touro Infirmary, New Orleans

MAINE

*Eastern Maine General Hospital, Bangor

MARYLAND

Bay View Hospital, Baltimore
Franklin Square Hospital, Baltimore
Hebrew Hospital and Asylum, Baltimore
Johns Hopkins Hospital, Baltimore
Maryland General Hospital, Baltimore
*Mercy Hospital, Baltimore
St. Agnes Hospital, Baltimore
St. Joseph's Hospital, Baltimore
University Hospital, Baltimore

MASSACHUSETTS

Boston City Hospital, Boston
*Carney Hospital, Boston
Children's Hospital, Boston
City Hospital, Fall River
*Holyoke City Hospital, Holyoke
*Lawrence General Hospital, Lawrence
Lowell Corporation Hospital, Lowell
Lowell General Hospital, Lowell
Massachusetts General Hospital, Boston
Massachusetts Homeopathic Hospital, Boston
Memorial Hospital, Worcester
*New England Hospital for Women and Children, Boston
Peter Bent Brigham Hospital, Boston
St. Elizabeth's Hospital, Boston
*St. Vincent's Hospital, Worcester
Springfield Hospital, Springfield
Union Hospital, Fall River
*Worcester City Hospital, Worcester

MICHIGAN

Battle Creek Sanitarium, Battle Creek
*Blodgett Memorial Hospital, Grand Rapids
*Butterworth Hospital, Grand Rapids
*Children's Free Hospital, Detroit
*Detroit Receiving Hospital, Detroit
Grace Hospital, Detroit
Harper Hospital, Detroit
*House of Providence, Detroit
St. Joseph's Hospital, Ann Arbor
*St. Mary's Hospital, Detroit
*St. Mary's Hospital, Grand Rapids
University Hospital, Ann Arbor
University of Michigan Homeopathic Hospital, Ann Arbor
*Women's Hospital and Infants' Home, Detroit

MINNESOTA

*Asbury Methodist Deaconess Hospital, Minneapolis
*Bethesda Hospital, St. Paul
City and County Hospital, St. Paul
Colonial Hospital, Rochester
*Fairview Hospital, Minneapolis
Minneapolis City Hospital, Minneapolis
*Mounds Park Sanitarium, St. Paul
*Norwegian Lutheran Deaconess Hospital, Minneapolis
*St. Joseph's Hospital, St. Paul
*St. Luke's Hospital, St. Paul
St. Mary's Hospital, Duluth
St. Mary's Hospital, Minneapolis
St. Mary's Hospital, Rochester
Swedish Hospital, Minneapolis
University of Minnesota Hospital, Minneapolis
Worrell Hospital, Rochester

MISSISSIPPI

*Matty Hersee Hospital, Meridian

MISSOURI

*Alexian Brothers Hospital, St. Louis
Barnes Hospital, St. Louis
*Children's Hospital, Kansas City
*Christian Church Hospital, Kansas City
*Jewish Hospital, St. Louis
Kansas City General Hospital, Kansas City
Research Hospital, Kansas City
*St. Anthony's Hospital, St. Louis
*St. John's Hospital, St. Louis
St. Joseph's Hospital, Kansas City
St. Louis Children's Hospital, St. Louis
St. Louis City Hospital, St. Louis
*St. Luke's Hospital, St. Louis
St. Mary's Hospital, St. Louis
St. Mary's Hospital, Kansas City
*Wesley Hospital, Kansas City

MONTANA

*Columbus Hospital, Great Falls
Murray Hospital, Butte
*St. Patrick's Hospital, Missoula

NEBRASKA

St. Elizabeth's Hospital, Lincoln
*St. Francis Hospital, Grand Island
St. Joseph's Hospital, Omaha
University of Nebraska Hospital, Omaha

NEW JERSEY

*Alexian Brothers Hospital, Elizabeth
*All Souls Hospital, Morristown
*Bayonne Hospital and Dispensary, Bayonne
Christ Hospital, Jersey City
*Cooper Hospital, Camden
Elizabeth General Hospital and Dispensary, Elizabeth
*Hackensack Hospital, Hackensack
Jersey City Hospital, Jersey City
Mercer Hospital, Trenton
Morristown Memorial Hospital, Morristown
*Mountainside Hospital, Montclair
*Muhlenburg Hospital, Plainfield
Newark City Hospital, Newark
Newark Memorial Hospital, Newark
*Orange Memorial Hospital, Orange
Passaic General Hospital, Passaic
Paterson General Hospital, Paterson
St. Elizabeth's Hospital, Elizabeth
*St. Francis Hospital, Trenton

NEW YORK

*Albany Hospital, Albany
Bellevue Hospital, New York
Beth Israel Hospital, New York
*Binghamton City Hospital, Binghamton
Brooklyn Hospital, Brooklyn
*Buffalo City Hospital, Buffalo
*Buffalo Homeopathic Hospital, Buffalo
*Bushwick Hospital, Brooklyn
*Children's Hospital, Buffalo
Coney Island Hospital, Brooklyn
Cumberland Street Hospital, Brooklyn
*Community Hospital, New York
*Ellis Hospital, Schenectady
*Flushing Hospital and Dispensary, Flushing
*Fordham Hospital, New York
Gouverneur Hospital, New York
Greenpoint Hospital, Brooklyn
Hahnemann Hospital of the City of New York, New York
Hahnemann Hospital, Rochester
Harlem Hospital, New York
*Holy Family Hospital, Brooklyn
*Homeopathic Hospital, Albany
Jewish Hospital, Brooklyn
Kings County Hospital, Brooklyn
*Lebanon Hospital, New York
*Lincoln Home and Hospital, New York
Long Island College Hospital, Brooklyn
*Memorial Hospital, New York
*Methodist Episcopal Hospital, Brooklyn
Metropolitan Hospital, New York
*Mt. St. Mary's Hospital, Niagara Falls
Mt. Sinai Hospital, New York
New York City Hospital, Blackwell's Island, New York
*New York Hospital, New York
New York Orthopedic Dispensary and Hospital, New York
New York Post-Graduate Medical School and Hospital, New York
New York Skin and Cancer Hospital, New York
*New York Society for the Relief of Ruptured and Crippled, New York
*Niagara Falls Memorial Hospital, Niagara Falls
Presbyterian Hospital, New York
*Rochester General Hospital, Rochester
Rochester Homeopathic Hospital, Rochester
*Roosevelt Hospital, New York
St. Catherine Hospital, Brooklyn
*St. John's Brooklyn Hospital, Brooklyn
*St. John's Hospital, Long Island
St. Luke's Hospital, New York
*St. Mark's Hospital, New York
*St. Mary's Free Hospital for Children, New York
St. Mary's Hospital, Brooklyn
St. Vincent's Hospital, New York
Samaritan Hospital, Troy
Sloane Hospital for Women, New York
*Staten Island Hospital, Tompkinsville
*Troy Hospital, Troy
Woman's Hospital, New York

NORTH CAROLINA

*Watts Hospital, West Durham

NORTH DAKOTA

Bismarck Evangelical Hospital, Bismarck
St. John's Hospital, Fargo

OHIO

*Christ Hospital, Cincinnati
Cincinnati General Hospital, Cincinnati
*City Hospital, Akron
*Cleveland City Hospital, Cleveland
Good Samaritan Hospital, Cincinnati
*Good Samaritan Hospital, Zanesville
*Hawkes Hospital of Mount Carmel, Columbus
*Jewish Hospital, Cincinnati
Lakeside Hospital, Cleveland
*Lucas County Hospital, Toledo
*Miami Valley Hospital, Dayton
*Mercy Hospital, Hamilton
Mt. Sinai Hospital, Cleveland
*People's Hospital, Akron
*St. Alexis Hospital, Cleveland
*St. Elizabeth's Hospital, Dayton

*St. Elizabeth's Hospital, Youngstown
*St. John's Hospital, Cleveland
*St. Luke's Hospital, Cleveland
*St. Rita's Hospital, Lima
St. Vincent's Hospital, Cleveland
St. Vincent's Hospital, Toledo
*Springfield City Hospital, Springfield
Toledo Hospital, Toledo
*Youngstown Hospital, Youngstown

OKLAHOMA

St. Anthony's Hospital, Oklahoma City
*State University Hospital, Oklahoma City

OREGON

St. Vincent's Hospital, Portland

PENNSYLVANIA

Data concerning hospitals in Pennsylvania were obtained in co-operation with the Pennsylvania Bureau of Medical Education and Licensure.

Allegheny General Hospital, Pittsburgh
Allentown Hospital, Allentown
Altoona Hospital, Altoona
Columbia Hospital, Pittsburgh
Conemaugh Valley Memorial Hospital, Johnstown
Easton Hospital, Easton
Hahnemann Medical College Hospital, Philadelphia
Harrisburg Hospital, Harrisburg
Hospital of the University of Pennsylvania, Philadelphia
Hospital of the Women's Homeopathic Association of Pennsylvania, Philadelphia
Hospital of the Women's Medical College, Philadelphia
Jefferson Medical College Hospital, Philadelphia
Jewish Hospital, Philadelphia
Lancaster General Hospital, Lancaster
Lankenau Hospital, Philadelphia
McKeesport Hospital, McKeesport
Medico-Chirurgical Hospital, Philadelphia
Mercy Hospital, Pittsburgh
Mercy Hospital, Wilkes-Barre
Methodist Episcopal Hospital, Philadelphia
Misericordia Hospital, Philadelphia
Moses Taylor Hospital, Scranton
Passavant Hospital, Pittsburgh
Pennsylvania Hospital, Philadelphia
Philadelphia General Hospital, Philadelphia
Philadelphia Orthopedic Hospital, Philadelphia
Philadelphia Polyclinic Hospital, Philadelphia
Pittsburgh Hospital, Pittsburgh
Presbyterian Hospital, Philadelphia
Presbyterian Hospital, Pittsburgh
Robert Packer Hospital, Sayre
Sacred Heart Hospital, Allentown
St. Francis Hospital, Pittsburgh
*St. John's General Hospital, Pittsburgh
St. Joseph's Hospital and Dispensary, Pittsburgh
St. Luke's Hospital, South Bethlehem
St. Margaret's Hospital, Pittsburgh
St. Mary's Hospital, Philadelphia
St. Timothy's Hospital, Philadelphia
*St. Vincent's Hospital, Erie
South Side Hospital, Pittsburgh
State Hospital of Middle Coal Fields, Hazelton
Western Pennsylvania Hospital, Pittsburgh
Wilkes-Barre City Hospital, Wilkes-Barre
Wills Eye Hospital, Philadelphia
Women's Hospital, Philadelphia

RHODE ISLAND

Rhode Island Hospital, Providence

SOUTH CAROLINA

*Chick Springs Sanitarium, Chick Springs
*Florence Infirmary, Florence
Roper Hospital, Charleston

SOUTH DAKOTA

*St. Luke's Hospital, Aberdeen

TENNESSEE

*Baroness Erlanger Hospital, Chattanooga
*Nashville City Hospital, Nashville
*St. Joseph's Hospital, Memphis
*St. Thomas Hospital, Nashville

TEXAS

John Sealy Hospital, Galveston
*Parkland Hospital, Dallas
*Providence Sanitarium, Waco
*St. Joseph's Infirmary, Fort Worth
*St. Joseph's Infirmary, Houston
*St. Mary's Infirmary, Galveston
*St. Paul's Sanitarium, Dallas
*Santa Rosa Hospital, San Antonio
Temple Sanitarium, Temple
Texas Baptist Memorial Sanitarium, Dallas

UTAH

*Doctor W. H. Groves Latter Day Saints Hospital, Salt Lake City
*Holy Cross Hospital, Salt Lake City

VERMONT

*Mary Fletcher Hospital, Burlington

VIRGINIA

*University of Virginia Hospital, Charlottesville
*Virginia Hospital, Richmond

WASHINGTON

Children's Orthopedic Hospital, Seattle
Providence Hospital, Seattle
St. Elizabeth's Hospital, North Yakima
St. Joseph's Hospital, Tacoma
*St. Luke's Hospital, Spokane
*Seattle City Hospital, Seattle
Seattle General Hospital, Seattle

WEST VIRGINIA

*Kessler-Hatfield Hospital, Huntington
*Ohio Valley General Hospital, Wheeling
*St. Mary's Hospital, Clarksburg
*Sheltering Arms Hospital, Hansford
*Wheeling Hospital, Wheeling

WISCONSIN

*La Crosse Lutheran Hospital, La Crosse
Luther Hospital, Eau Claire
*Madison General Hospital, Madison
Milwaukee County Hospital, Milwaukee
*Milwaukee Hospital, Milwaukee
*Mt. Sinai Hospital, Milwaukee

Sacred Heart Hospital, Eau Claire
St. Agnes Hospital, Fond du Lac
St. Francis Hospital, La Crosse
St. Joseph's Hospital, Marshfield
St. Joseph's Hospital, Milwaukee
*St. Mary's Hospital, Green Bay
Trinity Hospital, Milwaukee

WYOMING

Wheatland Hospital, Wheatland

CANADA

ALBERTA

Calgary General Hospital, Calgary
Holy Cross General Hospital, Calgary

BRITISH COLUMBIA

Provincial Royal Jubilee Hospital, Victoria
*Royal Columbia Hospital, New Westminster
St. Joseph's Hospital, Victoria
St. Paul's Hospital, Vancouver
Vancouver General Hospital, Vancouver

MANITOBA

Children's Hospital, Winnipeg
St. Boniface Hospital, St. Boniface
Winnipeg General Hospital, Winnipeg

NOVA SCOTIA

Victoria General Hospital, Halifax

ONTARIO

Hospital for Sick Children, Toronto
Kingston General Hospital, Kingston
*St. Michael's Hospital, Toronto

QUEBEC

Children's Memorial Hospital, Montreal
*Hotel Dieu, Montreal
*Jeffrey Hales Hospital, Quebec
Montreal General Hospital, Montreal
Notre Dame Hospital, Montreal
Royal Victoria Hospital, Montreal

SASKATCHEWAN

*Grey Nuns' Hospital, Saskatoon
Regina General Hospital, Regina

THE GREAT MACE PRESENTED TO THE AMERICAN COLLEGE OF SURGEONS BY THE CONSULTING SURGEONS OF THE BRITISH ARMIES

THE ceremony of presenting the Great Mace to the American College of Surgeons was an occasion of much interest to the Fellows of the College who were in attendance at the initial meeting of the tenth annual session of the Clinical Congress, held in Montreal.

The presentation committee consisted of Sir Berkeley Moynihan, K.C.M.G., C.B., Leeds, England; Sir William Taylor, K.B.E., C.B., Dublin, Ireland; and A. Carless, C.B.E., London, England. In making the presentation, Sir Berkeley Moynihan, chairman of the committee, said:

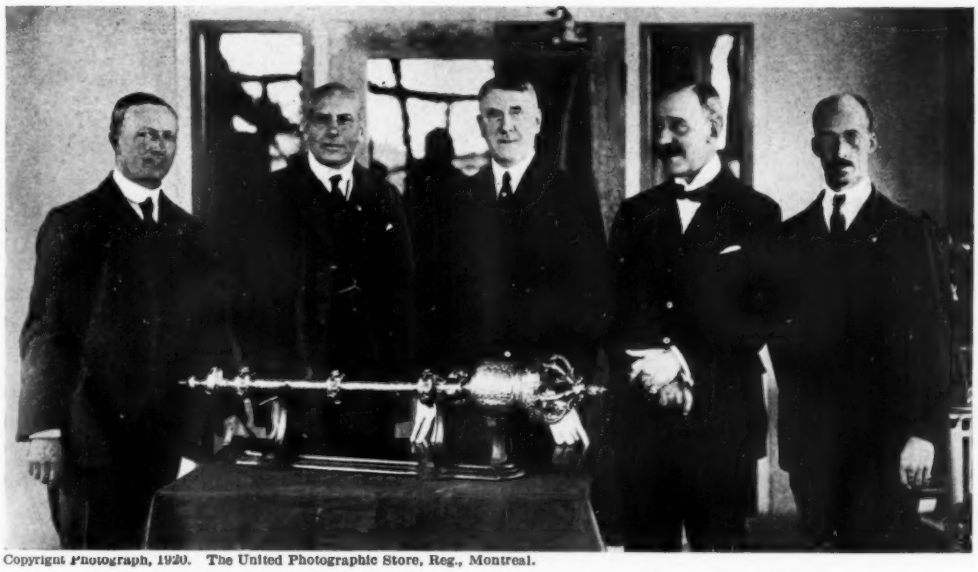
"Three centuries ago, on this very day, a little sailing vessel, leaving England far behind her, was struggling against adverse winds and heavy seas toward America. On board were one hundred pilgrims fleeing from civil and religious tyranny to seek sanctuary and freedom in a new land. No voyage in history has been so fateful. Those who journeyed in that vessel, a chosen company on the horizon of your history, were the best of English stock. They helped to found here a small colony of people, grim and stoical in spirit, yet touched with idealism. Though all the great countries of the earth have since given of their best to build this nation, those few pilgrims have left their indelible stamp upon the culture, the institutions, and the laws of this land.

"Almost a century and a half ago that Colony broke away from the Mother Country with which it was long at war. But one hundred years of peace between the two nations had been celebrated when in 1917 they stood together in arms. War is the great Revealer. We learned in that great testing time of our race that ties of blood when they mean kinship in spirit and an equal surrender to the noblest impulse are never to be broken. In the Great War, America and the Empire mingled their blood upon the same stricken field. The hope then grew strong in many hearts that a new understanding born of comradeship in battle, fiercely tested in the furnace of affliction, and sealed in death, would redeem the ancient blunders, blot out the bitter memories of wrong, and lead at last to a supreme and permanent reconciliation. For we seemed then to realize that deep down in the hearts, enthroned in the conscience of the two peoples there was the same full eager devotion to eternal principle, love of justice, joy in liberty, hatred of oppression; the same unselfish determination to strive for the redemption of mankind and to establish anew the freedom of the world. On the fields of Flanders and of France, as in the cabin of the Mayflower, humanity recovered its rights.

"In the grave and anxious days of war when we fought so long in fellowship, no associations were closer, no friendship more swift and intimate, no joint labors more fruitful than those of the members of our profession coming from America and from every part of the British Empire. We then gained each for the other, not respect and sympathy alone; but true affection also. Every lover of his country; every lover of Humanity must wish that the spiritual alliance then created shall endure to the end of time. In our desire to perpetuate the remembrance of those days of duty done together, we, the consulting surgeons of the British Armies, ask the College of Surgeons of America, meeting in this great Dominion to accept this Mace. We pray that you may regard it as a symbol of our union in the harsh days of trial; as a pledge of our devotion to the same imperishable ideals; as a witness to our unfaltering and unchanging hope that the members of our profession in the two lands shall be joined in brotherhood for ever in the service of mankind."

The President of the College, Dr. George E. Armstrong, of Montreal, responding said:

"Sir Berkeley Moynihan, as President of the American College of Surgeons, I accept this beautiful Mace presented by you on behalf of the consulting surgeons of the British Armies, with thanks and with full appreciation of the care and thought bestowed upon its design and construction. We accept it as a token of the cordial relationship that obtains between the surgeons of the two great nations here represented. It is a symbol of the zeal and enthusiasm in our art, which, arising in the Old World, has spread to the New World. We shall endeavor on this Western Hemisphere to keep the sacred flame of science burning not less brightly than did our forebears in Great Britain. It will remain with us as an emblem of unity, a work of art, and a remembrance of the great effort of the two great English-speaking nations to give truth.



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THE GREAT MACE, COMMITTEE OF DONORS, RECIPIENT, AND THE MACE BEARER.

Left to right: Sir William Taylor, K.B.E., C.B., Dublin; George E. Armstrong, M.D., C.M.G., President, American College of Surgeons, Montreal; Sir Berkeley Moynihan, K.C.M.G., C.B., Leeds; A. Carless, C.B.E., London; F. A. C. Scrimger, M.D., C.M., V.C., Montreal.

liberty, and justice to all peoples and to all nations. The scientific fire represented in this gift, welds another link in the chain that binds us forever in united effort to promote the highest possible standard of surgery, as well as peace and good-will among men."

DESCRIPTION OF THE GREAT MACE

This Mace has been designed so as to tell in symbolic language of the close union between American and British surgery and of the ties which unite Great Britain to Canada and the United States of America. It retains the traditional shape and proportions of the Civic Mace of the seventeenth century, and is of hand-wrought, chiseled, and repoussé silver gilt. It has been designed and made by Omar Ramsden, who has embodied the suggestions of the donors.

The dedicatory inscription engraved on the plate under the crown sets forth that it is a gift "From the Consulting Surgeons of the British Armies to the American College of Surgeons, in memory of mutual work and good-fellowship in the Great War, 1914–1918."

The crown-shaped finial is formed of six rich scroll buttresses upholding the "Sacred Flame of Science," issuing from a mortar of antique pattern, the model of which was recently found on the Field of Battle near Salonika. These buttresses spring from a cresting composed of alternating maple leaves and American eagles intertwined with the serpents of Æsculapius; and below there is a circular band with the words "The American College of Surgeons."

The body or head is divided into six panels by the winged caduceus; being an ornamental rendering of the badge of the United States Army Medical Corps. The panels set forth the following "Achievements at Arms" in delicate and finely detailed repoussé work:

1st—The full blazon of the United States of America.

2nd—The Dominion of Canada.

3rd—The Royal College of Surgeons of England.

4th—The Badge of the Royal Army Medical Corps.

5th—The shields of arms of John Hunter and Lord Lister.

6th—A cartouche bearing the words, "Philip Syng Physick 1768–1837, Father of American Surgery."

The lower portion of the head is decorated with a symbolic band of water indicating the

ocean which both unites and separates America and the Mother Country. The latter is symbolized by the British lion brackets of highly chiseled work which support the head and terminate the upper part of the staff. The talons of the lion's feet grip the hammered decoration of the upper knop, which consists of a design of American and Canadian maple seed-pods and heart-shaped spaces. This hammered work is protected by boldly projecting, solid, jewel-like bosses of chiseled work.

The staff is decorated with a free design of the national floral emblems of the United Kingdom—the rose, the thistle, the shamrock, and the leek. Intertwined among these are a number of ribbon scrolls, each one of which bears the name of one of the donors.

The foot bears, as decoration, the root form from which the above spring and a series of six small shields which may be used for possible future arms or inscriptions. The extreme bottom knop is fluted with leaves of Isatlis Tinctoria. "In the beginning there was Woad."

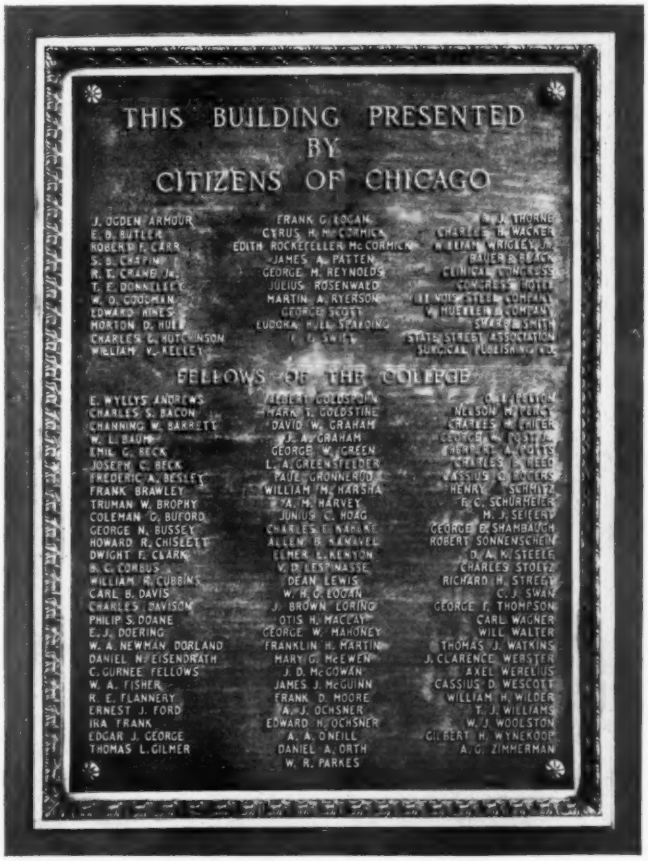
The various parts are held together, in the traditional manner, by a rod of English oak, cut from a tree grown at Wytham, Berks. The extreme length is 3 feet 11⅛ inches, and the weight of silver is 140 ounces troy.

List of the consulting surgeons of the British Armies who have given the Great Mace to the American College of Surgeons:

Sir Charles Ballance, K.C.M.G., C.B.
Sir Hamilton Ballance, K.B.E., C.B.
Sir Gilbert Barling, Bart., C.B.
Seymour Barling, C.M.G.
Sir Anthony Bowlby, K.C.B., K.C.M.G., K.C.V.O., D.S.M. (U. S. A.).
Dr. H. Bruce.
F. Burghard, C.B.
H. Burrows, C.B.E.
A. Carless, C.B.E.
Sir Arthur Chance, C.B.E.
C. C. Choyce, C.M.G., C.B.E.
Sir Kennedy Dalziel.
R. Davies-Colley, C.M.G.
T. P. Dunhill, C.M.G.
J. M. Elder, C.M.G.
Sir Crisp English, K.C.M.G.
H. A. Fairbank, D.S.O.
C. H. S. Frankau, C.B.E., D.S.O.
Forbes Fraser, C.B.E.
Sir Peter Freyer, K.C.B.
A. Fullerton, C.B., C.M.G.
George Gask, C.M.G., D.S.O.
Sir Henry Gray, K.B.E., C.B.
Sir Robert Jones, K.B.E., C.B., D.S.M. (U. S. A.)
R. E. Kelly, C.B.
Sir Arbuthnot Lane, Bart., C.B.
Sir William Lister, K.C.M.G.
V. Warren Low, C.B.
Sir George Makins, G.C.M.G., C.B.
Sir Arthur Mayo-Robson, K.B.E., C.B., C.V.O.
A. B. Mitchell, O.B.E.
Sir Berkeley Moynihan, K.C.M.G., C.B.
Sir Thomas Myles, C.B.
T. H. Openshaw, C.B., C.M.G.
Colonel A. Pilcher, C.B., D.S.O.
Owen Richards, C.M.G., D.S.O.
Sir Hugh Rigby, K.C.V.O.
Percy Sargent, C.B.
James Sherren, C.B.E.
Maynard Smith, C.B.
Thomas Sinclair, C.B.
Sir Harold Stiles, K.B.E.
James Swain, C.B., C.B.E.
Sir Charters Symonds, K.B.E., C.B.
Sir William Taylor, K.B.E., C.B.
Sir John Lynn-Thomas, K.B.E., C.B.
Alexis Thomson, C.M.G.
Sir William Thorburn, K.B.E., C.B.
A. Tubby, C.B.
H. Wade, C.M.G., D.S.O.
Sir Cuthbert Wallace, K.C.M.G., C.B.
Sir Charles Gordon Watson, K.C.M.G.
A. Webb-Johnson, C.B.E., D.S.O.
Sir W. de C. Wheeler.

THE NEW HOME OF THE COLLEGE

ON May 1, 1920, the administrative offices of the American College of Surgeons were transferred to the permanent location at 40 East Erie Street, Chicago.



The new home of the College, which is a commodious and handsome structure, with adjoining land suitable for future extension, was purchased and presented to the College by public-spirited lay citizens of Chicago and a group of Fellows of the College residing in that city. The home, besides furnishing an adequate business office for the College, will provide a dignified and suitable meeting place for local and visiting surgeons. This property, coming to the College as an absolute gift, becomes a valuable asset, and its central location in the heart of Chicago makes it an ideal permanent home for the institution.

On this page appears a reproduction of the bronze tablet which adorns the building and on which is recorded the names of those who contributed to its purchase. This property is within a few blocks of the center of the business loop of Chicago, and in a location that is not only ideal for the home of our institution, but one in which the land value will rapidly increase.

The Fellows of the College are invited to inspect the new home and to make it their headquarters when visiting Chicago.

THE COLLEGE LIBRARY

A GIFT of inestimable value has been bestowed upon the Fellows of the American College of Surgeons in the library of Dr. John B. Murphy, a library which only a master mind could have collected. It will serve as a continual source of inspiration to many who have not had the privilege of learning directly from the great teacher and surgeon.

There is not a field in surgery which has not been profoundly influenced by Doctor Murphy's discoveries. His achievements in various fields—particularly in the surgery of the bones and joints, the abdomen, the vascular system, and the nervous system—were the product of a genius and skill seldom equaled. In the library which has passed on to us will be found many of the choicest scientific works with personal annotations indicating constant use. The fundamental branches of anatomy, physiology, and pathology are represented by some of the finest works produced in both America and Europe. The section on cancer is particularly complete. The surgical portion of the library is very comprehensive, including especially interesting collections on orthopedic, abdominal, and genito-urinary surgery in addition to the best of the general surgical monographs. Through the generosity of Mrs. Murphy, the leading surgical works published during the past four years have been added to the collection. The library will be exceedingly useful for reference and research purposes, in that it contains bound files of the leading medical and surgical journals—American, English, and German—for the past 30 years, and some for even longer periods. The proceedings of the leading surgical societies are also represented. That Doctor Murphy was a true scholar with very broad literary and scientific interests is exemplified by the fact that various works on general science, biography, and excellent dictionaries and encyclopædias are included in this collection.

The clearness of his vision and complete knowledge of the work of those who preceded him have given to his scientific contributions rare qualities of permanence and originality. It is hoped that this library may form the nucleus for one of the best surgical libraries in the country, and that the library, together with the literary research department to be organized in conjunction with it, may help to spread the ideals of this great teacher and surgeon. It will be the aim of the department to further the standardization of literature on surgery and closely allied subjects, to help in the preparation of contributions to surgical literature, and to encourage the wider reading and study of scientific subjects through the more general establishment of hospital libraries and smaller literary research departments, thus perpetuating the scientific spirit which animated the life of the great surgeon.

MEETINGS OF STATE CLINICAL SECTIONS

State sectional meetings of the Clinical Congress of the American College of Surgeons were held during November as follows:

Arizona—Phoenix, November 15 and 16.

California—San Francisco, November 18 and 19.

Utah—Salt Lake City, November 22 and 23.

Colorado—Denver, November 26 and 27.

Other state sectional meetings scheduled to be held in the immediate future are:

New York—Buffalo, December 3 and 4.

Illinois—Peoria, December 16, 17 and 18.